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Teutonic
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Text.

The Teutonic language is supposed to have been the language of the ancient Germans, and hence is reckoned amongst the mother-tongues. See PHILOLOGY, n° 219.

TEUTONIC Order, an order of military knights, established towards the close of the twelfth century, on the following occasion.—When the emperor Barbarossa engaged in a crusade for the recovery of the Holy Land out of the hands of Saladin, he was followed by great numbers of German volunteers, who from various motives enlisted under his banners. After the death of Barbarossa, the Germans, who had signalized themselves before Acre or Ptolemais, resolved to choose another leader; and at last fixed their choice upon Frederic duke of Suabia, second son to the emperor, and Henry duke of Brabant. Under these generals they behaved with so much bravery, that Henry king of Jerusalem, the patriarch, and several other princes, determined to reward their valour by instituting an order of knighthood in their favour. This was accordingly done; and our new knights had at first the title of the *knights of St George*; afterwards it was thought proper to put them under the tutelage of the Virgin Mary, to whom there was already an hospital dedicated on Mount Zion, for the relief of German pilgrims. From this time they were called *Equites Mariani*, or knights of St Mary. Laws, regulations, and statutes, were drawn up for them by the Christian kings in Syria and the patriarch; and among other obligations it was required, that every person admitted to the privileges of the order should be of noble parentage; that the order should defend the Christian religion and the Holy Land; that they should exercise hospitality towards the Christians in general, but particularly those of their own country; and that they should with all their power endeavour to propagate and extend the Christian faith and the religion of Jesus. In the year 1190, having become rich by donations from the superstitious, they elected their first grandmaster, Henry Walpot, a German, who had distinguished himself by his zeal and valour; and their choice was confirmed by the emperor. The following year, pope Celestine III. confirmed their privileges already granted, giving them the title of the *Teutonic knights of the hospital of St Mary the Virgin*. By the conditions of this bull, they vowed perpetual continence, obedience, and poverty; obligations which it may well be imagined were not very strictly kept. See POLAND, n° 59, 61, 67—69. and PRUSSIA, n° 3, 4.

TEWKESBURY, a town in Gloucestershire, formerly noted for its monastery. It is now a large handsome corporation, containing about 500 houses, with a magnificent church. It is seated at the confluence of the rivers Severn and Avon, has a cotton manufactory, and sends two members to parliament. W. Long. 2. 13. N. Lat. 52. 0.

TEXEL, a town of the United Provinces, in north Holland, seated at the mouth of the Zuyder-Zee, with a good harbour, and a strong fort. It is seated in a fruitful island, known all over the world by the great number of ships that pass this way every day from all parts; it is about six miles long, and five broad, lying a little northward to the continent of Holland, between which and the island is one of the principal passages out of the Zuyder-Zee into the ocean. It is defended from the sea by sand-hills and strong banks. Most of the soil is applied to feed sheep, of which they have great flocks; and the cheese made of their milk is said to vie with the Parmesan. This island contains several fair villages, and a town on the east side, called *Burch*, strongly fortified and garrisoned, and inhabited chiefly by fishermen. N. Lat. 53. 8. E. Long. 4. 51.

TEXT, a relative term, contradistinguished to gloss or commentary, and signifying an original discourse exclusive of any note or interpretation. This word is particularly

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used for a certain passage of scripture, chosen by a preacher to be the subject of his sermon.

TEXTURE, properly denotes the arrangement and cohesion of several slender bodies or threads interwoven or entangled among each other, as in the webs of spiders, or in the cloths, stuffs, &c.

Texture is also used in speaking of any union or constituent particles of a concrete body, whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compressing, attracting, or any other way. In which sense we say, a close compact texture, a lax porous texture, a regular or irregular texture, &c.

TEWIT, in ornithology. See TRINGA.

THABOR. See TABOR.

THALES, a celebrated Greek philosopher, and the first of the seven wise men of Greece, was born at Miletus about 640 B. C. In order to improve himself in the knowledge of the sciences, he travelled into Egypt, where he discoursed with the priests and other learned men. Some say that he married; but others observe, that he eluded the solicitations of his mother on this head, by telling her, when he was young, that it was too soon; and afterwards, that it was too late. Thales acquired great reputation by his wisdom and learning: he was the first among the Greeks who foretold eclipses of the sun, and made extraordinary discoveries in astronomy. Thales was the author of the Ionian sect of philosophers, who were thus called from his being born at Miletus, a city of Ionia. He maintained that water was the principle of which all the bodies in the universe are composed; that the world was the work of God; and that God sees the most secret thoughts in the heart of man. He said, "That the most difficult thing in the world is to know ourselves; the most easy to advise others; and the most sweet to accomplish our desires. That, in order to live well, we ought to abstain from what we find fault with in others. That the bodily felicity consists in health, and that of the mind in knowledge. That the most ancient of beings is God, because he is uncreated: that nothing is more beautiful than the world, because it is the work of God; nothing more extensive than space, quicker than spirit, stronger than necessity, wiser than time." It was also one of his sentences, "That we ought never to say that to any one that may be turned to our prejudice; and that we should live with our friends as with persons that may become our enemies." He thanked God for three things; that he was born of the human, not of the brute species; a man, and not a woman; a Greek, and not a barbarian. None of the ancient philosophers ever applied themselves more earnestly to the study of astronomy than Thales. Diogenes Laertius reports, that leaving his lodging with an old woman to contemplate the stars, he fell into a ditch; on which the good woman cried, "How canst thou know what is doing in the heavens, when thou canst not perceive what is at thy feet?" He went to see Cræsus, who was marching with a powerful army into Capadocia, and enabled him to pass the river Halys without making a bridge. Thales died soon after, at about 90 years of age. He composed several treatises in verse, on meteors, the equinoxes, &c. but they are all lost.

THALIA, in Pagan mythology, one of the nine muses. She presided over Comedy; and is represented crowned with a garland of ivy, holding a mask in her hand, and wearing buskins on her feet.

THALIA, in botany: A genus of plants belonging to the class of *monandria*, and order of *monogynia*; and in the natural system ranging under the 8th order, *Scitamineæ*. The corolla is pentapetalous and undulated; and the drupe has a

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Texture
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Thalia.

Thalic-
trum,
Thame.

bilocular kernels. There is only one species, the geniculata.

THALICTRUM, MEADOW-RUE, in botany: A genus of plants belonging to the class of *polyandria*, and order of *polygynia*; and in the natural system ranging under the 26th order, *Multiflorae*. There is no calyx; the petals are four or five in number, and the seeds are naked and without a tail. There are 15 species; three of which are indigenous, the *flavum*, *minus*, and *alpinum*.

1. The *flavum*, or common meadow-rue, has a leafy furrowed stalk, and a manifold erect panicle. It has commonly 24 stamina, and from 10 to 16 pistils. The root and leaves of this plant dye a yellow colour, and cattle are fond of it. It grows on the banks of some rivers: It is found at North Queen's-ferry, Fifeshire. 2. The *minus*, or small meadow-rue, has sexpartite leaves, and bending flowers. The stalk is striated, and about a foot high; the leaves are lax and divaricated, having rigid footstalks; they are smooth and glaucous, and their lobes generally trifid; the panicle is branched and open, and the flowers nod: the petals are pale green, tinged with red; the stamina are from 15 to 20; the seeds deeply striated, and from two to seven in number. This plant is frequent in sandy soils and mountainous pastures. 3. The *alpinum*, or alpine meadow-rue, has a very simple stalk, and almost naked; and a racemus simple and terminal. It is a pretty little plant, about a fingers-length in height; the leaves all rise from the root, the stalk being naked and branched; the flowers nod, and have 4 petals, 12 stamina, and 8 pistils. It is frequent on the sides of rivulets in the highland mountains and other places.

THAMES, the finest river in Great Britain, which takes its rise from a copious spring, called *Thames Head*, two miles south-west of Cirencester in Gloucestershire. It has been erroneously said, that its name is *Isis* till it arrives at Dorchester, 15 miles below Oxford, when, being joined by the Thame or Tame, it assumes the name of the Thames, which, it has been observed, is formed from a combination of the words Thame and Isis. What was the origin of this vulgar error, cannot now be traced. Poetical fiction, however, has perpetuated this error, and invested it with a kind of classical sanctity. "It plainly appears (says Camden), that the river was always called *Thames* or *Tems*, before it came near the Thame; and in several ancient charters granted to the abbey of Malmesbury, as well as that of Ensham, and in the old deeds relating to Cricklade, it is never considered under any other name than that of *Thames*." He likewise says, that it occurs nowhere under the name of *Isis*. All the historians who mention the incursions of Ethelwold into Wiltshire in the year 905, or of Canute in 1016, concur likewise in the same opinion, by declaring, that they passed over the Thames at Cricklade in Wiltshire. It is not probable, moreover, that Thames Head, an appellation by which the source has usually been distinguished, should give rise to a river of the name of *Isis*; which river, after having run half its course, should reassume the name of Thames, the appellation of its parent spring. About a mile below the source of the river is the first corn-mill, which is called *Kemble Mill*. Here the river may properly be said to form a constant current; which, though not more than nine feet wide in the summer, yet in the winter becomes such a torrent as to overflow the meadows for many miles around. But, in the summer, the Thames Head is so dry, as to appear nothing but a large dell, interspersed with stones and weeds. From Somersford the stream winds to Cricklade, where it unites with many other rivulets. Approaching Kemsford, it again enters its native county, dividing it from Berkshire at Ingleham. It widens considerably in its way to Lechlade; and being there joined by the Lech and Coln,

at the distance of 138 miles from London, it becomes navigable for vessels of 90 tons. At Ensham, in its course north-east, to Oxford, is the first bridge of stone; a handsome one, of three arches, built by the earl of Abingdon. Passing by the ruins of Godslow nunnery, where the celebrated Fair Rosamond was interred, the river reaches Oxford, in whose academic groves its poetical name of *Isis* has been so often invoked. Being there joined by the Charwell, it proceeds south-east to Abingdon, and thence to Dorchester, where it receives the Tame. Continuing its course south-east by Wallingford to Reading, and forming a boundary to the counties of Berks, Bucks, Surry, Middlesex, Essex, and Kent, it washes the towns of Henley, Marlow, Maidenhead, Windfor, Eton, Egham, Staines, Laleham, Chertsey, Weybridge, Shepperton, Walton, Sunbury, East and West Moulsey, Hampton, Thames Ditton, Kingston, Teddington, Twickenham, Richmond, Isleworth, Brentford, Kew, Mortlake, Barnes, Chiswick, Hammersmith, Putney, Fulham, Wandsworth, Battersea, Chelsea, and Lambeth. Then, on the north bank of the river, are Westminster and London, and, on the opposite side, Southwark; forming together one continued city, extending to Limehouse and Deptford; and hence the river proceeds to Greenwich, Erith, Greenhithe, Gray's Thurrock, Gravesend, and Leigh, into the ocean. It receives in its course from Dorchester the rivers Kennet, Loddon, Coln, Wey, Mole, Wandle, Lea, Roding, Darent, and Medway. The jurisdiction of the lord mayor of London over the Thames extends from Coln Ditch, a little to the west of Staines, to Yendal or Yenleet to the east, including part of the rivers Medway and Lea; and he has a deputy, named the water-bailiff, who is to search for and punish all offenders against the laws for the preservation of the river and its fish. Eight times a year the lord mayor and aldermen hold courts of conservance for the four counties of Surry, Middlesex, Essex, and Kent. Though the Thames is said to be navigable 138 miles above the bridge, yet there are so many flats, that in summer the navigation westward would be intirely stopped, when the springs are low, were it not for a number of locks. But these are attended with considerable expence; for a barge from Lechlade to London pays for passing through them 13l. 15s. 6d. and from Oxford to London 12l. 18s. This charge, however, is in summer only, when the water is low; and there is no lock from London Bridge to Bolter's Lock; that is, for 51½ miles above the bridge. The plan of new cuts has been adopted, in some places, to shorten and facilitate the navigation. There is one near Lechlade, which runs nearly parallel to the old river, and contiguous to St John's Bridge; and there is another a mile from Abingdon, which has rendered the old stream toward Culham Bridge useless. But a much more important undertaking has lately been accomplished; namely, the junction of this river with the Severn. A canal had been made, by virtue of an act of parliament in 1730, from the Severn to Wall Bridge, near Stroud. A new canal now ascends by Stroud, through the Vale of Chalford, to the height of 343 feet, by means of 28 locks, and thence to the entrance of a tunnel near Sapperton, a distance of near eight miles. The canal is 42 feet in width at top and 30 at the bottom. The tunnel (which is extended under Sapperton Hill, and under that part of earl Bathurst's grounds called *Haley Wood*, making a distance of two miles and three furlongs) is near 15 feet in width, and can navigate barges of 70 tons. The canal descending hence 134 feet, by 14 locks, joins the Thames at Lechlade, a distance of above 20 miles. In the course of this vast undertaking, the canal, from the Severn at Froamlade to Ingleham, where it joins the Thames, is a distance of more than 30 miles.

Thames.

Brooke's
Gazetteer.

Thames, The expence of it exceeded the sum of 200,000*l.* of which 3000*l.* are said to have been expended in gunpowder alone, used for the blowing up of the rock. This new canal was completed in 1789, in less than seven years from its commencement. A communication, not only with the Trent, but with the Mersey, has likewise been effected by a canal from Oxford to Coventry; and an act of parliament has passed to extend another canal from this, at Braunston, to the Thames at Brentford. This is to be called *The Grand Junction Canal*. On the extensive advantages resulting from these navigable communications from the metropolis with the ports of Bristol, Liverpool, Hull, &c. and the principal manufacturing towns in the inland parts of the kingdom, it is needless to expatiate. The tide flows up the Thames as high as Richmond, which, following the winding of the river, is 70 miles from the ocean; a greater distance than the tide is carried by any other river in Europe. The water is esteemed extremely wholesome, and fit for use in very long voyages, during which it will work itself perfectly fine.

THAMES is also the name of a river in the state of Connecticut in America. See the article **CONNECTICUT**.

THANE, or **THANUS**, a name given to the nobility in Britain before the time of William the Conqueror. It signifies a minister or honourable retainer, from the verb *thenian* "to minister." There were several degrees of nobility among the Anglo-Saxons; but those most commonly mentioned are the king's thanes and the alderman's thanes. The king's thanes seem to have been of three different degrees, according to their different degrees of wealth or favour at court. The alderman's thanes seem to have been of the lowest degree of nobility, and next to them those who were promoted to that dignity from their advancement in the church, from their valour, success in agriculture or commerce: for if a ceorl or farmer applied to learning and attained to priests orders, if he acquitted himself so well as to obtain from a nobleman five hythes of land, or a gilt sword, helmet, and breast-plate, the reward of his valour; or if by his industry he had acquired the property of five hythes of land; or if he applied to trade, and made three voyages beyond sea in a ship of his own, and a cargo belonging to himself—he was denominated a *thane*.

The thanes, who were the only nobility among the Anglo-Saxons, were a very numerous body of men, comprehending all the considerable landholders in England, and filling up that space in society between the ceorls or yeomanry on the one hand, and the royal family on the other; which is now occupied both by the nobility and gentry. In times of war, they constituted the flower of their armies, and in times of peace they swelled the trains of their kings, and added greatly to the splendour of their courts, especially at the three great festivals of Christmas, Easter, and Whitsuntide. From this body all the chief officers, both civil and military, as aldermen, greeves, earls, heretogens, &c. were taken; and to obtain some of these offices was the great object of their ambition. Before they obtained an office, their lands were their only support; and they lived in greater or less affluence, according to the extent of their estates. These they divided into two parts; one of which they called their *inlands*, and the other their *outlands*. Their inlands they kept in their own immediate possession, and cultivated them by the hands of their slaves and villains, in order to raise provisions for their families; their outlands they granted to ceorls or farmers, either for one year, or for a term of years; for which they received a certain stipulated proportion of their produce annually. These customs had long prevailed among their ancestors in Ger-

many, and were adhered to by their posterity in England till the conquest.

The thanes were under no obligations on account of their lands, except the three following, which were indispensably necessary to the defence and improvement of their country: To attend the king with their followers in military expeditions, to assist in building and defending the royal castles, and in keeping the bridges and highways in proper repair. To these obligations all proprietors of land (even the churchmen for a long time not excepted) were subjected; and these services were considered as due to their country, rather than to the persons of their kings; and were agreed to by all as being necessary to their own preservation and convenience.

This title of thane was abolished in England at the conquest, upon the introduction of the feudal system by William. The titles of earl and baron were about the same period introduced into Scotland by Malcolm Canmore, and the title of thane fell into disuse.

THANET, an island of the county of Kent, surrounded by the sea except on the north-east side, where it is bounded by the branches of the river Stour, now inconsiderable to what they were formerly. It contains several villages, and the sea-port towns of Margate and Ramsgate, and has the title of an earldom. It is celebrated for being the spot through which arts, sciences, and divine knowledge, came into this happy isle. The Britons called it *Richborough*, from its vicinity to the city of that name, now only a venerable ruin; but the Saxons called it *Thanet*, from fire, having so many beacons erected on it. It is in the north-east part of the county, lies open to the sea on the north and east, with the river Wantsum on the west and south, is about 10 miles long from the North Foreland to Saire-Bridge, and about 8 broad from Westgate to Sandwich-Ferry. The north part of it is all arable, except some barren land, that is sown with saintfoin, which produces a load and sometimes two loads of hay upon an acre; by which means, the land that otherwise is not worth half-a-crown an acre yields 30*s.* or 40*s.* The south and west parts of the island are most of them marsh or pasture lands. The soil is generally very fertile, especially in the best of barley, and other sorts of grain, of which it is computed above 20,000 quarters are sent hence to London in a year, besides what is sold to other places. The *alga marina*, or sea-ore, as they call it, is their chief manure. This they dry on the shore, and burn, in order to make kelp, which the potters use in glazing their ware. But the smell of the rotten ore upon the soil, and the smoke of it when burning, is very noisome. The gentlemen's families are for the most part gone from this part of the county, having sold their estates; so that their mansion seats are converted into farm-houses; but then, on the other hand, many of the yeomen and farmers have good estates, on which they live very genteelly. In this island are ten parishes, but seven parish-churches, and one chapel.

THAPSIA, the DEADLY CARROT, in botany: A genus of plants belonging to the class of *pentandria*, and order of *digynia*; and in the natural system ranging under the 45th order, *umbellatæ*. The fruit is oblong and girt with a membrane. There are five species; the *villosa*, *foetida*, *asclepium*, *garganica*, and *trifoliata*. The roots of the *foetida* were formerly ordered in medicine, but are now entirely disused; a small dose operating with extreme violence both upwards and downwards.

THAWING, the resolution of ice into its former fluid state by the warmth of the air. See **CONGELATION** and **FROST**.

THEA, in botany. See **TEA**.

Theatines,
Theatre.

THEATINES, a religious order in the Romish church, so called from their principal founder John Peter Caraffa, then bishop of Theate, or Chieti, in the kingdom of Naples, and afterwards pope, under the name of *Paul IV.* The names of the other founders were Gaetan, Boniface, and Configlieri. These four pious men desiring to reform the ecclesiastical state, laid the foundation of an order of regular clerks at Rome in the year 1524. Pope Clement VII. approved the institution, and permitted the brethren to make the three religious vows, to elect a superior every three years, and to draw up statutes for the regulation of the order. They first endeavoured, by their example, to revive among the clergy the poverty of the apostles and first disciples of our Saviour, and were the first who assumed the title of *regular clerks*.

THEATRE, a place in which shows or dramatic representations are exhibited.

For the origin of the dramatic art we always turn our eyes to Greece, the nursery of the arts and sciences. It may indeed have been known among more ancient nations, but no records remain sufficient to support this opinion. The different states of Greece asserted their claim to the honour of having given it birth, but the account of the Athenians is most generally received. It derived its origin from the hymns which were sung in the festivals of Bacchus in honour of that deity. While these resounded in the ears of the multitude, choruses of Bacchantes and Fauns, ranged round certain obscene images which they carried in triumphal procession, chanted lascivious songs, and sometimes sacrificed individuals to public ridicule.

Anacharsis's
Travels,
vol. i.

This was the practice in the cities; but a still greater licentiousness reigned in the worship paid to the same divinity by the inhabitants of the country, and especially at the season when they gathered the fruits of his beneficence. Vintagers, besmeared with wine-lees, and intoxicated with joy and the juice of the grape, rode forth in their carts, and attacked each other on the road with gross sarcasms, revenging themselves on their neighbours with ridicule, and on the rich by publishing their injustice.

Among the poets who flourished at that time, some celebrated the great actions and adventures of gods and heroes, and others attacked with asperity the vices and absurdities of individuals. The former took Homer for their model, and supported themselves by his example, of which they made an improper use. Homer, the most tragic of poets, the model of all who have succeeded him, had in the *Iliad* and the *Odyssey* brought to perfection the heroic poem, and in his *Margites* had employed pleasantry. But as the charm of his works depends in a great measure on the passions and motion with which he knew to animate them, the poets who came after him endeavoured to introduce into theirs an action which might excite emotion or mirth in the spectators: some even attempted to produce both, and ventured certain rude essays, which have since been styled indifferently either tragedies or comedies, because they unite the characters of those two dramas. The authors of these sketches have been distinguished by no discovery; they only form in the history of the art a succession of names which it would be useless to recal to light.

The necessity and power of theatrical interest was already known. The hymns in honour of Bacchus, while they described his rapid progress and splendid conquests, became imitative; and in the contests of the Pythian games, the

players on the flute who entered into competition were enjoined by an express law to represent successively the circumstances that had preceded, accompanied, and followed the victory of Apollo over Python.

Some years after this regulation, Susarion and Thespis, both born in a small borough of Attica, named *Icaria*, appeared each at the head of a company of actors, the one on a kind of stage, the other in a cart (A). The former attacked the vices and absurdities of his time; and the latter treated more noble subjects, which he took from history.

The comedies of Susarion were in the same taste with those indecent and satirical farces which were afterwards performed in some of the cities of Greece. They were long the favourite entertainment of the country people. Athens did not adopt this species of exhibition until after it was brought to perfection in Sicily.

Thespis had more than once seen in the festivals, in which as yet hymns only were sung, one of the fingers, mounted on a table, form a kind of dialogue with the chorus. From this hint he conceived the idea of introducing into the tragedies an actor who, by simple recitals introduced at intervals, should give relief to the chorus, divide the action, and render it more interesting. This happy innovation, together with some other liberties in which he had allowed himself, gave alarm to the legislator of Athens, who was more able than any other person to discern the value or danger of the novelty. Solon condemned a species of composition in which the ancient traditions were disguised by fictions. "If we applaud falsehood in our public exhibitions (said he to Thespis), we shall soon find that it will insinuate itself into our most sacred engagements."

The excessive approbation and delight with which both the city and country received the pieces of Thespis and Susarion, at once justified and rendered useless the suspicious foresight of Solon. The poets, who till then had only exercised their genius in dithyrambs and licentious satire, struck with the elegant forms which these species of composition began to assume, dedicated their talents to tragedy and comedy. Soon after a greater variety was introduced in the subjects of the former of these poems. Those who judge of their pleasures only from habit exclaimed, that these subjects were foreign to the worship of Bacchus; but the greater number thronged with still more eagerness after the new pieces.

Phrynichus, the disciple of Thespis, made choice of that kind of verse which is most suitable to the drama, was the author of some other changes, and left tragedy in its infancy.

Æschylus received it from his hands enveloped in a rude vestment, its visage covered with false colours, or a mask inexpressive of character, without either grace or dignity in its motions, inspiring the desire of an interest which it with difficulty excited, still attached to the buffooneries which had amused its infant years, and expressing its conceptions sometimes with elegance and dignity, but frequently in a feeble and low style, polluted with gross obscenities.

In his first tragedies he introduced a second actor; and afterward, copying the example of Sophocles, who had just entered on his theatrical career, he admitted a third, and sometimes even a fourth. By this multiplicity of personages, one of his actors became the hero of the piece, and attracted to himself the principal interest; and as the chorus now held only a subaltern station, Æschylus took care to shorten

(A) Susarion represented his first pieces towards the year 580 before Christ. Some years after, Thespis made his first attempts in tragedy, and acted his *Alceste* in 536.

Theatre. shorten its part, and perhaps even carried this precaution too far.

He is censured for having admitted mute characters into his drama. Achilles, after the death of his friend, and Niobe, after the destruction of her children, appear on the stage, and remain during several scenes motionless, with their heads covered with a veil, and without uttering a word; but if their eyes had overflowed with tears, and they had poured forth the bitterest lamentations, could they have produced an effect so terrible as this veil, this silence, and this abandonment to grief?

It was not sufficient that the noble and elevated style of tragedy should leave in the minds of the auditors a strong impression of grandeur; to captivate the multitude, it was requisite that every part of the spectacle should concur to produce the same effect. It was then the general opinion that nature, by bestowing on the ancient heroes a more lofty stature, had impressed on their persons a majesty which procured them as much respect from the people as the ensigns of dignity by which they were attended. Æschylus therefore raised his actors on high stilts or buskins. He covered their features, which were frequently disagreeable, with a mask that concealed their irregularity. He clothed them in flowing and magnificent robes, the form of which was so decent, that the priests of Ceres have not blushed to adopt it. The inferior actors were also provided with masks and dresses suited to their parts.

Instead of those wretched scaffolds which were formerly erected in haste, he obtained a theatre furnished with machines, and embellished with decorations. Here the sound of the trumpet was reverberated, incense was seen to burn on the altars, the shades of the dead to arise from the tomb, and the furies to rush from the gulphs of Tartarus. In one of his pieces these infernal divinities appeared, for the first time, with masks of a horrid paleness, torches in their hands, serpents intertwined in their hairs, and followed by a numerous retinue of dreadful spectres. It is said that, at the sight of them, and the sound of their terrific howlings, terror seized on the whole assembly, women miscarried, and children expired with fear; and that the magistrates, to prevent similar accidents in future, commanded that the chorus should consist only of fifteen actors instead of fifty.

The effect of so many new objects could not but astonish the spectators; nor were they less surprised and delighted at the intelligence displayed in the performance of the actors, whom Æschylus almost always exercised himself. He regulated their steps, and taught them to give additional force to the action by new and expressive gestures.

The progress of the art was extremely rapid. Æschylus was born 525 years before Christ, 11 years after Thespis had acted his *Alceſtis*. He had for competitors Chœrilus Pratenas, and Phrynichus, whose glory he eclipsed, and Sophocles, who rivalled his own. Sophocles was born about the year 497 B. C. about 14 years before Euripides. These carried tragedy to the highest perfection to which it attained among the Greeks. Æschylus painted men greater than they can be, Sophocles as they ought to be, and Euripides as they are.

Invented towards the 50th Olympiad (about 580 B. C.), and adapted to the rude manners of the rustics, comedy ventured not to approach the capital; and if by chance some companies of actors, who were unconnected with any others, found their way into the city, and performed their indecent farces, they were less authorised than tolerated by the government. It was not till after a long infancy that this species of drama began suddenly to make a rapid improvement in Sicily. Instead of a succession of scenes without connection or tendency, the philosopher Epicharmus intro-

duced an action, all the parts of which had a dependence on each other; and conducted his subject, without wandering from it, through a just extent to a determinate end. His pieces, subjected to the same laws as tragedy, were known in Greece, where they were considered as models; and comedy soon shared with her rival the suffrages of the public, and the homage due to genius. The Athenians, especially, received her with the same transports as they would have testified at the news of a victory: many of their poets exercised their genius in this novel species of composition; and their names adorn the numerous list of writers who have been distinguished in comedy from the time of Epicharmus. Such were, among the more ancient, Magnes, Cratinus, Crates, Pherecrates, Eupolis, and Aristophanes. They all flourished in the age of Pericles.

If we peruse the comic pieces which have come down to us, we shall be convinced that the sole object of the authors was to please the multitude. The gods and heroes were travestied, gross and obscene language was often employed, and virulent invectives were often thrown out against individuals of the first rank for genius and virtue. Towards the end of the Peloponnesian war the licentiousness of comedy was restrained. The chorus was laid aside, because the rich citizens were alarmed, and would no longer contribute money to support it, nor provide masks with portraits for exposing individuals.

The poets being thus restrained from mentioning names of living persons on the stage, invented false names. They still exposed real and known characters; and thus gave a more exquisite gratification to the spectators, who were highly amused with finding out the persons intended. The consequence of the law was only to make that done with delicacy which was formerly done in the most indecent and scurrilous manner. Aristophanes, in some of his latest pieces, has given us some good examples of this kind of comedy, which is sometimes called the middle comedy.

Comedy was still liable to abuse, and therefore required farther reformation. As the use of real names had formerly been prohibited, real subjects were also forbidden; and comedy from that time was no longer a fury armed with torches, or a firebrand scattering mischief, but a pleasing and instructive companion. This is called the new comedy. The most eminent among the Greeks in this improved species was Menander. His writings are now lost; but we may form a good estimate of their merit from the comedies of Terence, which are said to have been borrowed from Menander, and to have nearly resembled the original, though inferior in that *vis comica* by which the elegant Grecian was distinguished. The comedy of Menander is that which has been cultivated in modern times.

To give some idea of a Grecian theatre, we shall describe very shortly the theatre of Bacchus in Athens, which was built by the famous architect Philo in the time of Pericles. The part intended for the spectators was of a semicircular form, at the diameter of which was erected the stage. The orchestra occupied the space where the pit in modern theatres is situated, where the music, the chorus, and the mimi were placed. It was four feet elevated above the ground. The spectators were arranged in three galleries round all the sides of the orchestra except that next the stage, each gallery containing eight rows of seats. At the farther end of the orchestra, where the stage is erected in modern theatres, stood the thymele or logeon, but projecting a little towards the audience. It was a little higher than the orchestra, and did not extend the whole breadth of it. In some theatres it was only six feet square. Here the principal part of the chorus made their recitations, and in comical interludes the mimi performed. Behind the thymele

Theatre.

Theatre. mele appeared the stage or proscenion, considerably elevated. No part of this theatre was covered except the stage, and a high gallery called *circus* set apart for the women. The Athenians, being exposed to the weather, came usually with great cloaks, to secure them from the rain or the cold; and for defence against the sun, they had the *sciadion*, a kind of parasol, which the Romans used also in their theatres by the name of *umbellæ*; but when a sudden storm arose, the play was interrupted, and the spectators dispersed.

A sort of tent-work over the entire area of the edifice might have been contrived as a shelter from the rain and a shade from the sun. Such a covering would have obviated the inconveniences of roofed theatres, which obstruct the free communication of the air, and of unroofed theatres, which do not keep out the weather. At Athens the plays were always represented in the day-time, which made the unroofed theatres less inconvenient.

Plays were represented only during the three festivals solemnized in honour of Bacchus. The first of these was celebrated at the Piræus, where some of Euripides's pieces were first performed. The second, which lasted only one day, was kept at the end of January or beginning of February. The third, called the greater *Dionysia*, was celebrated a month after. It continued several days, and attracted a great multitude of spectators. In the festivals which lasted only one day, five or six dramatic pieces, either tragedies or comedies, were performed. But in the greater *Dionysia*, which continued longer, 12 or 15, and sometimes more, were acted. The performance began early in the morning, and sometimes lasted the whole day.

The chorus, according as the subject demanded, was composed of men and women, old men or youths, citizens or slaves, priests, soldiers, &c. to the number of 15 in tragedy, and 24 in comedy. The chorus came upon the stage preceded by a flute-player, who regulated their steps; sometimes one after the other, but in tragedy more frequently three in front and five in depth, or five in front and three in depth.

The same persons performed both in tragedy and comedy; but, as among ourselves, it was rare to meet with any who excelled in both. The pay of those who had acquired great reputation was considerable. Polus gained a talent in two days (equal to L. 225 Sterling*). Players of eminence were solicited by different actors of Greece to attend their festivals. If, after making an engagement, they failed, they were obliged to pay a certain sum of money; and if they were absent during the festivals of their own republic, they were condemned to a heavy fine.

The actors had habits and symbols suited to their parts. Kings wore a diadem, leaned on a sceptre which supported an eagle on its top, and were dressed in long robes of purple or other splendid colours ornamented with gold. Heroes, besides having their stature frequently increased to six feet English, and their bulk in proportion, were frequently covered with the skin of a lion or a tyger, and armed with swords, quivers, and clubs. All who suffered misfortunes wore a black, brown, or dirty white garment, which frequently hung in tatters. There were various kinds of masks for tragedy, comedy, and satire. These certainly took away the pleasure arising from the expression of the countenance; but at any rate, little pleasure could be derived from this circumstance in a Grecian theatre, from its immense size, and the great distance of the audience from the stage.

Dramatic entertainments were introduced at Rome in the year of the city 391. They were called *ludi scenici*, because they were first acted in a shade formed by the branches and leaves of trees. They were borrowed immediately from Etruria, whence also they received their first players. These

Etrurians at first only danced to a flute, without either singing or acting. The Roman youth soon imitated them at their solemn festivals, adding raillery in rude verses, and gestures adapted to the subject. These verses were called *Fescennini*, from Fescennia, a city of Etruria. Livius Andronicus was the first poet who wrote a regular play in Latin. This happened in the year of Rome 512 or 514, about 160 years after the death of Sophocles and Euripides, and 52 after that of Menander. The Grecian model was afterwards introduced and cultivated much by succeeding dramatic writers. This was the model of Menander, for the old and middle comedy was unknown at Rome. As the Romans were only imitators of the Greeks in the dramatic art, as well as in most of the arts and sciences, nothing more is necessary to be said in addition to the account which we have already given of the Grecian stage.

The origin of the English stage is hid in obscurity. It was not, however, copied from the Grecian or Roman; for it was evidently different in form as well as in matter, and may with more propriety be deduced from a Gothic original. It appears that there were theatrical entertainments in England almost as early as the conquest; for we are told by William Stephanides or Fitz-Stephen, a monk, who in the reign of Henry II. wrote his *Descriptio Nobilissimæ Civitatis Londoniæ*, that "London, instead of the common interludes of the theatre, had plays of a more holy kind; representations of the miracles of confessors, and the sufferings of martyrs. At this time there were also certain sets of idle people, who travelled the countries and were called *Mummers*, a kind of vagrant comedians, whose excellence consisted altogether in mimicry and humour."

It is probable that, soon after this time, the dramatic representations called *Mysteries* were exhibited: These mysteries were taken from scripture-history: some represented the creation of the world, with the fall of Adam and Eve; some the story of Joseph; and others even the incarnation and sufferings of the Son of God. These pieces were exhibited in a manner so ridiculous as to favour libertinism and infidelity, as appears by a petition of the chaunters of St Paul's cathedral to Richard II. in 1378, praying, that "some unexpert people might be prohibited from representing the history of the Old Testament to the prejudice of the said clergy, who had been at great expence to represent it publicly at Christmas."

In the year 1390, the parish clerks of London are said to have played interludes at Skinner's-well on three successive days in July; and, in 1409, to have acted for eight days successively a play concerning the creation of the world, at the same place which thence acquired the name of *Clerkenwell*.

These Mysteries were succeeded by Moralities, in which there were some rude traces of a fable and a moral; and some also of poetry, the virtues, vices, and other affections of the mind being frequently personified.

After these Moralities came what were called Interludes, which made some approaches to wit and humour. Many of these pieces were written by John Heywood, jester to Henry VIII.

In the time of Henry VIII. one or two pieces had been published under the classical names of *Comedy* and *Tragedy*, but they appear not to have been intended for popular use. It was not till the religious ferments had subsided that the public had leisure to attend to dramatic poetry. In the reign of Elizabeth, tragedies and comedies began to appear in form, and could the poets have persevered, the first models were good. *Gorboduc*, a regular tragedy, was acted in 1561; and Gascoigne, in 1566, exhibited *Jocasta*, a translation from Euripides, as also *The Supposes*, a regular comedy,

* Plut. in X. Rhet.

|| Arist. in Ran. v. 46. Athen. lib. v. cap. 7.

Gentleman's Magazine for 1761.

Cibber's Apology for his Life.

Percy's Relics of Ancient English Poetry.

Theatre. comedy, from Ariosto, near thirty years before any of Shakespeare's were printed.

The people however still retained a relish for their old mysteries and moralities, and the popular dramatic poets seem to have made them their models. The graver sort of moralities appear to have given birth to our modern tragedy; as our comedy evidently took its rise from the lighter interludes of that kind. And as most of these pieces contain an absurd mixture of religion and buffoonery, an eminent critic has well deduced from thence the origin of our unnatural tragicomedies. Even after the people had been accustomed to tragedies and comedies, moralities still kept their ground. One of them, intitled *The New Custom*, was printed so late as 1573. At length they assumed the name of *masques*, and, with some classical improvements, became in the two following reigns the favourite entertainments of the court.

As for the old mysteries, which ceased to be acted after the reformation, they seem to have given rise to a third species of stage exhibition; which, though now confounded with tragedy or comedy, were by our first dramatic writers considered as quite distinct from them both: these were historical plays, or histories; a species of dramatic writing which resembled the old mysteries in representing a series of historical events simply in the order of time in which they happened, without any regard to the three great unities. These pieces seem to differ from tragedy just as much as historical poems do from epic: as the *Pharsalia* does from the *Æneid*. What might contribute to make dramatic poetry take this turn was, that soon after the mysteries ceased to be exhibited, there was published a large collection of poetical narratives, called *the Mirror for Magistrates*, wherein a great number of the most eminent characters in English history are drawn relating their own misfortunes. This book was popular and of a dramatic cast; and therefore, as an elegant writer has well observed, might have its influence in producing historic plays. These narratives probably furnished the subjects, and the ancient mysteries suggested the plan.

That our old writers considered historical plays as somewhat distinct from tragedy and comedy, appears from numberless passages of their works. "Of late days (says Stow in his Survey of London), instead of those stage-plays have been used comedies, tragedies, interludes, and histories, both true and fained." Beaumont and Fletcher, in the prologue to the *Captain*, say,

"This is nor comedy, nor tragedy,

"Nor history." —

Polonius in *Hamlet* commends the actors as the best in the world, either for tragedie, comedie, historie, pastorall, &c. And Shakespeare's friends, Heminge and Condell, in the first folio edition of his plays, in 1623, have not only intitled their book "Mr William Shakespeare's Comedies, Histories, and Tragedies," but, in their table of contents, have arranged them under those three several heads; placing in the class of histories, "King John, Richard II. Henry IV. 2 pts, Henry V. Henry VI. 3 pts, Richard III. and Henry VIII."

This distinction deserves the attention of the critics: for if it be the first canon of sound criticism to examine any work by those rules the author prescribed for his first ob-

servance; then we ought to try Shakespeare's histories by the general laws of tragedy and comedy. Whether the rule itself be vicious or not, is another inquiry; but certainly we ought to examine a work only by those principles according to which it was composed. This would save much impertinent criticism.

Not fewer than 19 playhouses had been opened before the year 1633, when Prynne published his *Histrionastix*. From this writer we learn that tobacco, wine, and beer, were in those days the usual accommodations in the theatre, as now at Sadlers Wells. With regard to the ancient prices of admission, the playhouse called the *Hope* had five different priced seats, from sixpence to half-a-crown. Some houses had penny benches. The two-penny gallery is mentioned in the prologue to Beaumont and Fletcher's *Woman Hater*; and seats of threepence and a groat in the passage of Prynne last referred to. But the general price of what is now called the *Pit* seems to have been a shilling. The time of exhibition was early in the afternoon, their plays being generally acted by day light. All female parts were performed by men, no actresses being ever seen on the public stage before the civil wars. And as for the playhouse furniture and ornaments, they had no other scenes nor decorations of the stage, but only old tapestry, and the stage strewn with rushes, with habits accordingly; as we are assured in a short Discourse on the English Stage, subjoined to Flecknoe's *Love's Kingdom*, 1674, 12mo.

(B) For the state of the theatre during the time of Shakespeare, see *PLAYHOUSE*; where a full account of it is given from the late valuable edition of our illustrious poet's works by Mr Malone. During the whole reign of James I. the theatre was in great prosperity and reputation: dramatic authors abounded, and every year produced a number of new plays; it became a fashion for the nobility to celebrate their weddings, birth-days, and other occasions of rejoicing, with masques and interludes, which were exhibited with surprising expence; our great architect, Inigo Jones, being frequently employed to furnish decorations, with all the luxuriance of his invention and magnificence of his art. The king and his lords, and the queen and her ladies, frequently performed in these masques at court, and the nobility at their private houses; nor was any public entertainment thought complete without them. This taste for theatrical entertainments continued during great part of the reign of king Charles the first; but, in the year 1633, it began to be opposed by the Puritans from the press; and the troubles that soon after followed entirely suspended them till the restoration of king Charles the second in 1660.

The king, at his restoration, granted two patents, one to Henry Killigrew, Esq; and the other to Sir William Davenant, and their heirs and assigns, for forming two distinct companies of comedians. Killigrew's were called the *King's Servants*, and Davenant's the *Duke's Company*. About ten of the company called the *King's Servants* were on the royal household establishment, having each ten yards of scarlet cloth, with a proper quantity of lace allowed them for liveries; and in their warrants from the lord chamberlain they were styled *gentlemen of the great chamber*.

Till this time no woman had been seen upon the English stage, the characters of women having always been performed by boys, or young men of an effeminate aspect, which probably

(B) We have been anxious to give as full an account of the ancient English drama as we could: we must not omit, however, to inform our readers what Mr Malone says of the old plays, viz. that not one play published before 1592 will bear a second reading; and that, exclusive of mysteries, moralities, and translations, there are but 34 pieces extant which were published before that period.

Theatre. bably induced Shakespeare to make so few of his plays depend upon female characters, as they must have been performed to great disadvantage. The principal characters of his women are innocence and simplicity, such are Desdemona and Ophelia; and his specimen of fondness and virtue in Portia is very short. But the power of real and beautiful women was now added to the stage; and all the capital plays of Shakespeare, Fletcher, and Ben Jonson, were divided between the two companies, by their own alternate choice, and the approbation of the court.

The king's servants seem to have been allowed to be the best company; and when the variety of plays began to be exhausted, they drew the greater audiences. Davenant, therefore, to make head against them, first added spectacle and music to action, and introduced a new species of plays, since called *dramatic operas*; among these were, *The Tempest*, *Psyche*, and *Circe*; which, with many others, were set off with the most expensive decorations of scenes and habits, and with the best voices and dancers.

In 1684 the two houses united, and continued together for ten years. In 1690 the play began at four o'clock; and, we are told, the ladies of fashion used to take the evening air in Hyde-park after the representation; by which it appears that the exhibitions were in summer too. The principal actors were, Betterton, Montfort, Kynaston, Sandford, Nokes, Underhill, and Leigh, commonly called *Tony Leigh*; the actresses were, Mrs Betterton, Barry, Leigh, Butler, Montfort, and Bracegirdle; and to this company, in this year, old Cibber was admitted as a performer in the lowest rank. It was a rule with the patentees, that no young person, who offered himself as an actor, should be admitted into pay till after at least half a year's probation; and Cibber waited full three quarters of a year before he was taken into a salary of 10s. a week.

In 1695 a new theatre was opened with Mr Congreve's comedy of *Love for Love*, which had such extraordinary success (says Cibber) that scarce any other play was acted there till the end of the season; but when the season ended, which appears to have begun in June, he does not tell us, and it is indeed difficult to guess; for though the company acted in summer, it seems improbable that they should shut up the house in winter, as it is difficult to conceive any reason for so doing. Congreve was then in such high reputation, that this company offered him a whole share (but into how many shares the whole was divided Colley has not told us) upon condition he would give them a new play every year. This offer he accepted, and received the advantage, though he never fulfilled the condition; for it was three years before he produced the *Mourning Bride*, and three more before he gave them *the Way of the World*.

It is not necessary that we give in detail the remaining history of the English stage: those who are anxious to be acquainted with it may consult Cibber's history of the stage, continued by Victor, under the title of *A History of the Theatres of London and Dublin from the year 1730*. We shall only mention a few facts respecting the salaries of the players about that period, and the rise of the price of play-tickets.

A difference having arisen in 1733 between the managers and actors, most of the actors set up for themselves at the little theatre in the Haymarket. Upon this the managers published the following account of their salaries, to shew the public how little room they had to mutiny. To Mr Colley Cibber, from the time of letting his share till he left the stage, 12l 12s. *per week*. Mr The. Cibber 5l. and his wife's whole salary till her death, without doing the company any service the greatest part of the winter; and his own also, during the time of his being ill, who per-

formed but seldom till after Christmas. Mr Mills jun. 3l. under the same circumstances with regard to his wife. Mr Mills sen. 1l. *per day* for 200 days certain, and a benefit clear of all charges. Mr Johnston 5l. Mr Miller 5l. paid him eight weeks before he acted, besides a present of 10 guineas. Mr Harper 4l. and a present of 10 guineas. Mr Griffin 4l. and a present. Mr Shepard 3l. Mr Hallam, for himself and father (though the latter is of little or no service) 3l. Mrs Hieron 5l. raised from 40s. last winter, yet refused to play several parts assigned her, and acted but seldom this season. Mrs Butler 3l. *per week*. By these and other salaries, with the incident charges (besides clothes and scenes), the patentees are at the daily charge of 49l. odd money, each acting-day.

Till about the same time, the prices at the theatre were 4s. the boxes, 2s. 6d. the pit, 1s. 6d. the first gallery, and 1s. the second, except upon the first run of a new play or pantomime, when the boxes were 5s. the pit 3s. the first gallery 2s. and the second 1s. But Fleetwood thought fit to raise the prices for an old pantomime, which was revived without expence. This produced a riot for several nights, and at last a number deputed by the pit had an interview with the manager in the green room, where it was agreed, that the advanced prices should be constantly paid at the doors, and that such persons as did not choose to stay the entertainment should have the advanced part of their money returned. This was a very advantageous agreement for the manager; because, when the audience had once paid their money, and were seated, very few went out at the end of the play, and demanded their advanced money; the few that did it at first, soon grew tired, and at last it settled in the quiet payment of the advanced price, as at this day.

It has been frequently a subject of debate, whether the stage be favourable to morals. We do not mean to enter into the controversy; but we shall make an observation or two. It will be allowed by all, that the intention of the players in acting, is to procure money; and the intention of the audience in attending the theatre, is to seek amusement. The players then will only act such plays as they believe will answer their intention. And what sort of plays are these? They are such as correspond with the opinions, manners, and taste, of the audience. If the taste of the audience be gross, therefore the plays will be gross; if delicate and refined, they will be the same. And if we go back to the time of Shakespeare, we shall find that this has been uniformly the case. The conclusion, then, which we draw, is this, if the taste of the audience be pure, free from licentiousness, the plays will be the same, and the stage will be favourable to virtue.

THEBAIC POWDER. See *PHARMACY-Index*.

THEBAID, a celebrated heroic poem of Statius, the subject whereof is the civil war of Thebes, between the two brothers Eteocles and Polynices; or Thebes taken by Theseus.

THEBES, the name of a celebrated city of ancient Greece. It is supposed to have been built by Cadmus, about the year of the world 2555. This Cadmus, according to the Greeks, was the son of Agenor king of Sidon or Tyre; but the Sidonians allow him to have been of no higher quality than his cook, and tell us that his wife was a musician at court, with whom he ran away into Greece. The Greek writers tell us, that being commanded by his father to go in search of his daughter Europa, whom Jupiter in the shape of a bull had carried off, and forbid to return without her, he built, or rebuilt, the city of Thebes, after having long fought her in vain. He was at first opposed by the Hyantes and Aones; the former of whom he defeated in battle, and forced to retire into Locris: the

Theatre
||
Thebes.

Thebes. the latter submitted, and were incorporated among his subjects.

² Supposed to be one of the exiled Canaanites. Those who endeavour to extract some truth from the multitude of fables in which the early part of the Grecian history is obscured, are of opinion that Cadmus was one of the Canaanites expelled by Joshua; and that he was of the family of the Cadmonites mentioned by Moses and Joshua. He is universally allowed to have introduced the Phœnician letters into Greece, set up the first schools, and introduced brass; which, from him, had the name of *Cadmean* given to it. The government of Thebes continued for a long time monarchical; and the names of a number of its kings have been transmitted to us, with some account of their transactions; but so much obscured by fable, that little or nothing can be determined concerning them. We shall therefore pass over this fabulous part of their history, and only take notice of that period of it when the Thebans emerged from their obscurity, and for a time held the sovereignty of Greece.

³ The Thebans a degenerate stupid people. Though the Thebans had been famed in the early period of their history for their martial achievements, yet in process of time they seem to have degenerated. At the time of the invasion of Xerxes, they were the first people in Greece who were gained over to the Persian interest. On account of this misbehaviour, they were become very obnoxious to the other states, especially to the Athenians, whose power and renown increased every day, and threatened at last to swallow them up altogether. The Thebans being in no condition to oppose such a formidable power, put themselves under the protection of the Spartans, who, out of jealousy of the Athenians, readily forgave them; and so grateful were the Thebans for the kindness shown them at this time, that during the whole of the Peloponnesian war Sparta had not a more faithful ally. By these means they not only recovered the government of Bœotia, of which they had been formerly in possession, till deprived of it on account of their siding with the Persians, but their city became one of the first in Greece. By this prosperity the Thebans were so much elated, that, when the peace of Antalcidas came to be signed, they refused to agree to it, as they were thus once more deprived of the government of Bœotia; so that it was not without the utmost difficulty that they were overawed into it by the other states. Not content with forcing them to give up this point, however, the Spartans undertook to change the form of the Theban government, which at this time was a democracy, and accomplished through the treachery of those who had the care of the citadel.

⁴ Put themselves under the protection of the Spartans. The Thebans continued under the power of the Spartans for four years; at the end of which term a conspiracy being formed against them by some of the principal people in the city, among whom was a young nobleman named *Pelopidas*, the Spartans were massacred and driven out, and the citadel regained. During the tumult *Epaminondas*, afterwards the celebrated general, with a number of the best citizens, joined the party of *Pelopidas*; and the latter having called a general assembly of the Thebans, proclaimed liberty to them, and exhorted them in the strongest manner to fight for their country. This speech was received with the greatest acclamations; *Pelopidas* was unanimously proclaimed the preserver of Thebes, and was charged with the management of the war which was then to be declared against Sparta.

⁵ The form of government changed, and the citadel seized by the Spartans. These transactions so much exasperated the Spartans, that they immediately sent their king *Cleombrotus* against them, though it was then the depth of winter. The Athenians, in the mean time, who had hitherto assisted the Thebans, declined any farther connection, lest they should draw upon themselves the resentment of the Spartans. But

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they were soon after determined to act again on the same side, by an attempt which the Spartan general, *Sphodras*, had rashly made on the *Pyræum* or harbour of Athens. Thus, by means of the Athenians, a powerful diversion was made in favour of the Thebans, who gradually recovered all the towns of Bœotia, and at length began to act offensively against their enemies, and made a powerful invasion in Phocis. They had now many sharp encounters with them; which, though they did not amount to decisive battles, yet did not fail to raise their courage, and distress that of the Spartans. In these encounters *Pelopidas* always signalized himself; and in the battle of *Tanagra*, where the Lacedæmonians were entirely defeated by the Athenians and their allies, *Pelopidas* had a principal share in the victory, and killed the Spartan general with his own hand. Soon after this, with a body of only 300 Thebans, he entirely routed and dispersed near 1000 Spartans; which was the greatest disgrace the latter had ever known; for till that time, whether in war with the Greeks or Barbarians, they had never been overcome by an equal, much less by such an inferior, number of troops.

⁶ These successes of the Thebans greatly alarmed the Athenians, who continually sought to oppose their growing power. In this opposition they were joined by the *Plataeans*, who on this account became extremely obnoxious to the Thebans, so that they at last came to a resolution to surprise their city. This they accomplished, and entirely destroyed it, together with *Thespia*, another city extremely well affected to Athens. Soon after this, the Thebans, encouraged by their success, began to think of enlarging their territories, and of making encroachments on their neighbours, as they saw other states had done before them. This spirit of conquest is said to have been raised by their general *Pelopidas*; in which he was seconded by *Epaminondas*, a person who, though like him endowed with all the necessary qualities to make a complete captain or patriot, had till then preferred a private life, and lived in a constant course of virtue and the study of philosophy. He had as yet seldom appeared in public, except to get himself excused from those state-employments which were so eagerly courted by others. This, however, had not hindered him from contracting an intimate friendship with *Pelopidas*, which had been daily improved by the correspondence of their tempers and principles, as well as by that zeal which both displayed for the good of their country; which last had made them, even before this time, appear together in action, and to such advantage, that *Epaminondas's* merit could be no longer concealed, nor indeed suffer him to continue longer in his beloved retirement: so that he saw himself, at length, deservedly placed at the head of the Theban troops; where he gave such early proofs of his future prowess and abilities, as justly gave him the next rank to *Pelopidas*. Both came now to be considered in the same light, as generals in the field, as governors at home, and as complete statesmen in the council. When the general treaty for restoring peace to Greece came to be proposed by the Athenians, and was upon the point of being executed by the rest of the states, the Thebans refused to agree to it, unless they were comprehended in it under the name of *Bœotians*. This demand was as strenuously opposed by the other contracting powers as insisted on by *Epaminondas*, who was there as ambassador on the part of the Thebans. *Agésilas*, in particular, told him in plain terms, that the Thebans ought to evacuate Bœotia, and leave the cities of it free and independent. To which he was answered by him, that the Lacedæmonians would do well to set them the example, by restoring *Messenia* to its ancient proprietors, and *Laconia* to its ancient freedom; for that

Thebes.

⁸ The Spartans defeated by *Pelopidas*.

⁹ *Plataea* and *Thespia* razed by the Thebans.

¹⁰ Account of *Epaminondas*.

¹¹ His difference with *Agésilas* king of Sparta.

¹² ^{Thebes.} that the pretensions of the city of Thebes to Bœotia were as well founded, at least, as those of Sparta to these two countries. After this he went on, and showed how far Sparta had aggrandized herself at the expence of her neighbours: that peace might be indeed obtained, and upon a solid and lasting footing; but that this could not be otherwise than by bringing all to an equality. This bold, though just remonstrance, in which not only Thebes, but Greece in general was concerned, failed not, however, to exasperate the haughty Spartan monarch; and the Athenians, who had till now looked upon the Thebans as dependents either on them or on the Macedonians, were not a little offended to hear their ambassadors talk in such high terms. The result of the conference was, that Agesilaus struck the name of *Thebes* out of the treaty, and declared war against them, about the year 371 B. C.

¹² The Spartans declare war against Thebes.

The Thebans were in no small consternation to see themselves engaged in a war with the powerful Spartans, without any ally to assist them; and the rest of the Grecian states having made peace with the latter, began to look upon the ruin of the former as unavoidable. However, they resolved to make the best defence they could; and put their army under the command of Epaminondas, assigning him, at his own request, six others to act as counsellors or assistants. The Theban army consisted at most but of 6000 men, whereas that of the enemy was at least thrice that number; but Epaminondas trusted most to his horse, wherein he had much the advantage both in quality and good management: the rest he endeavoured to supply by the disposition of his men, and the vigour of the attack. He even refused to suffer any to serve under him in the engagement, but such as he knew to be fully resolved to conquer or die. The two armies met at LEUCTRA, where the Spartans were defeated with great slaughter, as related under that article.

¹³ Are entirely defeated at Leuctra.

The victorious general, desirous to improve this great victory, sent an herald, crowned with garlands, to communicate it in form to the Athenians, in hopes that this would be an effectual means to reunite them to the Theban interest. But it proved quite otherwise. Athens, which now looked upon them with a jealous eye, and had then in view the sovereignty of Greece, chose rather, if they could not wholly obtain it, to share it with Sparta, than to let the Thebans into the whole; and therefore even declined giving their herald audience. However, the Thebans took care to strengthen themselves by alliances; and, besides the Arcadians and Eleans, had got the Phocians, Locrians, Arcarnanians, Eubœans, and other states, under their dependence: so that they were now in a condition to act offensively against the Spartans. Accordingly, under pretence of assisting the Arcadians, they entered Peloponnesus with a gallant army, with Epaminondas and Pelopidas at their head. Here they were joined by the Arcadian and other confederate forces; so that the whole amounted to 40,000, some say 50,000 men, besides great numbers of those who followed the camp, rather for plunder than fighting, and were computed about 20,000 more. The army was divided into four columns, and moved straight towards Sellasia, the place of their rendezvous, from which they pursued their journey with fire and sword towards Sparta. But here they were repulsed by Agesilaus, who was then returned to that metropolis.

¹⁴ The Athenians jealous of the Thebans.

¹⁷ The Thebans invade Peloponnesus with a formidable army, but are repulsed.

To repair, in some measure, this disgrace, and at the same time to leave some lasting monument which should redound as much to his glory as to the mortification of the Spartans, Epaminondas left not their territories till he had restored the posterity of the old Messenians to their ancient dominions, out of which they had been banished near 300

years; rebuilt their capital, and left a strong garrison for its defence. He was, however, like to have been stopped in his return by Iphicrates, whom the Athenians had sent with 12,000 men to intercept him; but this last loitered so long at Corinth, that the Thebans had passed the defiles of Cenchreæ, the chief place where he could have obstructed his retreat had he taken possession of it in proper time. Epaminondas continued his march till he came in full view of the city of Corinth. He found the roads choaked up with trees, rocks, stones, and every thing that could render them impassable; and the Corinthians well fortified, and resolute on a stout defence. But he came so furiously upon them, notwithstanding all these difficulties, that they abandoned all their entrenchments and outworks to the Thebans, and fled into the city. Thither these pursued them sword in hand, and made an horrid slaughter of them; insomuch that Corinth must have unavoidably fallen into their hands, had their generals thought fit to pursue these advantages; but whether they were afraid of the Athenians falling upon them, or apprehended some dangerous ambush in a country with which they were but indifferently acquainted, or whether the army was too much weakened through so many fatigues, or lastly, whether the coldness of the season, it being then the depth of winter, would not permit them to proceed farther, they immediately marched towards Bœotia. This gave such an handle to their enemies, that they met with a very mortifying reception at their return to Thebes, where they were both arrested, and clapped up as state-prisoners, for having presumed to prolong their command four months longer than the time limited by law, which time took in almost the whole of their expedition from their first entrance into Peloponnesus. However, at last, the judges being ashamed to proceed any farther, they were both honourably acquitted.

¹⁸ The Messenians restored to their ancient dominions.

¹⁹ The Corinthians defeated.

²⁰ Epaminondas and Pelopidas disgraced at Thebes.

This prosecution had been chiefly carried on and encouraged by Meneclides, a discontented Theban, and a bold and able speaker, who, by his artful calumnies at the trial, had so far prevailed with the judges as to get Epaminondas deprived of the government of Bœotia for a whole year, though he could not gain the same advantage against Pelopidas, who was a greater favourite of the people, as being his senior.

By this delay the Spartans, with much difficulty, had recovered themselves from their great defeat at Leuctra, and settled their affairs in as good a posture as they could: but though they had repulsed the Thebans in Peloponnesus, yet from the exploits they had performed there, especially in the dismembering the whole kingdom of Messenia from them, they had still cause to fear what their forces might do under two such generals; and had accordingly taken due care to strengthen themselves against them, and to provide themselves with a great number of auxiliaries from other states, especially from that of Athens, with whom they had renewed their old treaty, and had agreed that each should have the command five days alternately. Soon after this treaty the Arcadians renewed the war, and took Pallene in Laconia by storm, put the garrison to the sword, and were presently assisted by the Argives and Eleans, and especially by the Thebans, who sent to them 7000 foot and 500 horse under the command of Epaminondas. This so alarmed the Athenians likewise, that they immediately sent Gobrias with some forces to oppose his passage in good earnest; and he so behaved himself against the Thebans, that they were forced to abandon Peloponnesus a second time. This unsuccessful gave fresh occasion to the enemies of Epaminondas to blame his conduct in the highest terms, notwithstanding the singular bravery with which he and his troops had forced the pass. Even his friends could not but suspect him of

²¹ War renewed with Sparta.

²² The Thebans repulsed.

²³ ^{Epaminondas degraded.} of partiality for the Spartans, in not pursuing his advantage over them, and making a greater slaughter of them when he had it in his power; whilst his enemies made it amount to no less than treachery to his country: so that their brave general was once more deprived of the government of Bœotia, and reduced to the condition of a private man. He did not continue long under this disgrace; before an occasion offered to make his services again of such necessity to the state, as to give him an opportunity to retrieve his fame, and wipe off the stain which his enemies had thrown upon him.

²⁴ ^{Pelopidas seized by Alexander of Pheræ.} The Thessalians, who had groaned some time under the tyranny of the usurper Alexander, surnamed the *Pheræan*, sent an embassy to Thebes to implore their aid and protection; upon which Pelopidas was immediately sent as ambassador to expostulate with him on their behalf. He was then in Macedon, from whence he took the young prince Philip, afterwards the celebrated monarch, in order to protect and educate him; and, upon his return, marched directly to Pharsalus in Thessaly, in order to punish the treachery of some mercenaries, who had deserted the Thebans in that expedition; but when he came thither, he was surprised to be met by the tyrant at the head of a numerous army before that city, whilst his own was but as an handful of men in comparison of it. However, whether he supposed, or would be thought to do so, that Alexander came thither to justify himself, and answer to the complaints alleged against him, he went, with Ismenias his colleague, to him unarmed and unattended, not doubting but his character as ambassador from so powerful a republic, joined to his own character and authority, would protect them from insult or violence: but he found himself mistaken; for Alexander had no sooner got them in his hands, than he caused them to be seized, and sent prisoners to Pheræ.

²⁵ ^{A Theban army sent to rescue him, defeated.} The Thebans, highly resenting the indignity offered to their ambassadors, sent immediately an army into Thessaly: but the generals were repulsed with great loss by the Pheræan usurper; and it was owing to Epaminondas, who was among them only as a private centinel, that they were not totally cut off. For the Thebans, finding themselves in such imminent danger, which they attributed to the incapacity of their generals, had immediately recourse to him, whose valour and experience had been so often tried; and, partly by persuasions and intreaties, and partly by threats, obliged him to take the command. This soon gave a different turn to their affairs, and converted their flight into a safe and regular retreat; for he took the horse and light-armed foot, and placed himself at their head in the rear, and charged the enemy with such vigour and bravery, that he obliged them to desist from their pursuit.

²⁶ ^{Epaminondas restored.} However, as the army had suffered such loss before as not to be able to pursue them in their turn, he was obliged to return with them to Thebes, with their pusillanimous generals; where the latter were fined 12,000 drachms each, and the former was reinstated in the command, and sent with a new reinforcement to repair the late dishonour, and prosecute their revenge. The news of his being in full march on this errand greatly alarmed the tyrant; but Epaminondas, preferring the safety of his imprisoned colleague to all other considerations, forbore pushing hostilities to extremes, for fear of provoking the enemy to wreak all his fury on him: to prevent which, he contented himself for a while hovering about with his army, and now-and-then with such slight skirmishes as should intimidate the tyrant, and bring him the sooner to make some satisfactory offers. Alexander being fully convinced of the superiority of the Theban general, was glad to accept of a truce of 30 days, and to restore Pelopidas and Ismenias to him; upon which he

immediately withdrew his forces, and returned with them to Thebes.

By this time Thebes was raised to a sufficient height of reputation and glory to begin to aim in earnest at the sovereignty of Greece. The main obstacle to it was, that the other states grew so jealous of her present greatness, as to enter into the strongest alliances and confederacies to prevent its farther growth; so that not being able now to procure many allies at home, they made no difficulty to seek for them abroad; and the Lacedæmonians, by leading the van, gave them a plausible pretence to follow their steps, and to procure an alliance with Persia, which at that time they found was ready to accept of the offers on any terms; the only question was, which of the three states should be preferred, Sparta, Athens, or Thebes. At the same time, the Thebans proposed to their new confederates to send likewise proper deputies to the Persian court, in order to support their respective interests; which they readily agreed to. These were the Arcadians, Eleans, and Ar-²⁸ ^{Success of Pelopidas at the Persian court.} givians; at the head of whose deputation Pelopidas was sent on the behalf of the Thebans; which the Athenians being apprised of, appointed two on their part. These being all arrived at the Persian court, began to pursue each their respective interests; but Pelopidas had by that time gained such credit there, both for his singular address and his extraordinary exploits, that he was distinguished in a particular manner from all the other deputies, and was received by the king with the most manifest marks of honour and esteem, who freely owned himself convinced that the Thebans were the people on whom he could most safely depend; and after having greatly applauded the equity of his demands, ratified and confirmed them with great readiness, to the no small mortification of the other states. The substance of them was, that the liberties formerly granted to the other towns of Greece should be confirmed; that Messenia, in particular, should continue free and independent on the jurisdiction of Sparta; that the Athenians should lay up their fleet; and that the Thebans should be looked upon as the ancient and hereditary friends of Persia.

The Thebans took advantage of the dissensions which prevailed among the Greeks as a pretence for increasing their forces; and Epaminondas thought it a proper opportunity for his countrymen to make a bold effort to obtain the dominion at sea, as they had obtained it in a great measure at land. He proposed it to them in a public assembly, and encouraged their hopes from the experience of the Lacedæmonians, who in Xerxes's time had, with ten ships only at sea, gained the superiority over the Athenians, who had no fewer than 200; and added, that it would be a disgrace now to Thebes to suffer two such republics to engross the empire of so extensive an element, without putting in at least for their share of it. The people readily came into his proposal, not without extraordinary applause, and immediately ordered 100 galleys to be equipped; and in the meanwhile sent him to Rhodes, Chios, and Byzantium, to secure those states in their interest, and get what assistance he could from them. His negotiations had all the success that could be wished for, notwithstanding the strenuous opposition of the Athenians, and of their admiral Laches, who was sent with a powerful squadron against him. But what more effectually thwarted all his measures, was the work that they found for him at land, and the obliging the Thebans to take part in the quarrels that then reigned among their neighbours: so that whatever projects they had concerted, proved abortive for the present; and the death of Epaminondas, which happened not long after, put an effectual stop to them.

During the absence of that general, and of his colleague Pelopidas,

³⁰ Thebes. Pelopidas, the Orchomenians, being spirited up by some Theban fugitives, had formed a design to change the Theban government into an aristocracy; and 300 horsemen of the former had been actually sent to put it in execution. Their project, however, was timely discovered by the vigilance of the magistrates, who caused them to be seized, and put immediately to death. They next sent a sufficient force against the city of Orchomenos, with orders to put all the men to death, and to sell the women and children for slaves, which was punctually done; after which they razed that noble city to the ground. Pelopidas was then on his way to Thessaly, at the head of a powerful army, whither he had been sent to assist the Thessalians, who still groaned under the tyranny of Alexander the Pheræan, and had made several brave efforts to recover their liberty, but had been still overpowered by that usurper. Being joined by the Thessalians, he encamped in the face of the enemy, though far superior in number, and consisting of above 20,000 men. A fierce engagement soon ensued, in which both sides fought with uncommon bravery. The place where the battle was fought was called *Cynocephala*, from several little hills on it, between which there ran a large plain. Both sides endeavoured at first to post themselves on these eminences with their foot, whilst Pelopidas ordered his cavalry to charge that of the enemy below; which they did with such success, that they soon put them to the rout, and pursued them over the plain. This obliged the tyrant to gain the tops of the hills, where he greatly annoyed the Thessalians that endeavoured to force those ascents; so that Pelopidas was obliged to give over his pursuit to come to their relief. This immediately inspired the Thessalians with fresh courage, who began again to charge the enemy at several onsets; and soon threw them into such disorder, that they were forced to give way. Pelopidas no sooner perceived the advantage, than he began to look about for Alexander, with a design of engaging him. Having found him out as he was commanding his right wing, and endeavouring to rally his men, he moved directly to him; and being got near enough to be heard by him, challenged him to decide the battle by single combat with him. Alexander, instead of accepting the offer, turned about, and with all the speed he could ran to screen himself amongst his guards. Upon this Pelopidas charged him with such furious speed, that he obliged him to retire farther, and shelter himself within the thickest ranks; the sight of which made him attack with fresh vigour, and fight more desperately against him. He tried in vain several times to break through their ranks to reach him, cutting down great numbers of those that came forward to oppose him: his eagerness at length exposed him so far to the darts that were shot at him at a distance, that some of them went quite through his armour, and gave him a desperate wound or two, while the rest advanced and stabbed him in the breast with their spears.

³² Is killed.

³³ Alexander defeated,

It is scarce possible for words to express the grief and despair which not only his brave Thebans, but likewise the Thessalians and other allies, showed at the sight of their slain general: some of the latter, who had perceived the danger he was exposed to, came down the hill with all possible speed to his relief; but when they perceived that they were come too late to save him, both they and the rest of the little army thought on nothing now but to revenge his death. They rallied accordingly, both horse and foot, as quick as possible, and began to charge the enemy afresh, and with such desperate fury, that they at length gained a complete victory over them, and killed above 3000 of them in their pursuit, besides a much greater number which they had slain on the field of battle, though they still looked up-

on all these advantages as vastly too small to compensate the loss of their brave general. Thebes.

The news of his death had no sooner reached Thebes, than the whole city was seen in as deep a mourning as his army. However, they sent a reinforcement to it of 7000 foot and 700 horse, as well to revenge the death of that general, as to improve the victory he had gained over the enemy; by the help of which they fell so furiously on them, that they quickly broke and totally defeated the shattered remains of Alexander's army. Hereupon he was forced to sue for peace, and to accept it on such conditions as the conquerors thought fit to impose. He was at length dispatched in his bed by his wife Thebe, assisted by her brothers, about seven years after his defeat. His body was afterwards dragged along the streets, trodden under foot, and left a prey to the dogs.

³⁴ And at last murdered.

All this while the Thebans were watching to improve every commotion that happened, every success they met with, to the forwarding of their then reigning and favourite project, of increasing their power above all the rest, and in their turn to give laws to Greece. Their late success in Thessaly, and the rupture between the Arcadians and Mantineans at the same time, about some consecrated money which the former had taken out of the temple of Olympias to pay their troops employed against the Eleans, and which the latter called a downright sacrilege, besides other discords that reigned in the other states of Greece, gave fresh encouragement to Thebes to set up for arbiters in those disputes; and so much the more, as those who had embezzled the sacred money, and wanted rather to embroil matters than to have them brought to light, sent that republic word that the Arcadians were just upon the point of revolting to the Spartans, and advised them to come and put an immediate stop to it. At the same time they dispatched some private directions to a Theban officer at Tegea, to apprehend several of their own people as disturbers of the peace. This was accordingly done, and several eminent persons were confined as prisoners of state: they were soon after discharged, and loud complaints were made against such arbitrary and unjust proceedings. The officer was accused before the Theban senate for having intermeddled in their affairs, and endeavoured to interrupt the good correspondence between the two states. It was even insisted on by some of the Tegeans, that he should be indicted and proceeded against by his principals; whilst the more moderate sort, who foresaw the consequences that were likely to attend such appeals, and that it would infallibly bring the Thebans upon them, loudly protested against their marching into their territories, and did all they could to prevent it. The Thebans, however, were become too powerful and ambitious to miss so fair an opportunity of getting once more footing in Peloponnesus, as they had long ago premeditated; and Epaminondas was so far from making a secret of their design, that he told the Arcadian deputies in justification of it, that as it was on their account that the Thebans engaged in the war, they had acted treacherously with them in making peace with Athens without their consent: however, that when he was got with his army on his march into Peloponnesus to assist his friends, he would soon see what proofs the Arcadians would give of their fidelity. This speech did not fail to alarm them greatly; especially as it was spoken in such a magisterial style and threatening tone. Even those who were best affected to the Thebans could not forbear expressing their dislike of it; and all that had the welfare of Peloponnesus at heart readily agreed with the Mantineans, that there was no time to be lost to use all proper means to prevent the impending storm.

³⁵ Ambition of the Thebans.

³⁶ Epaminondas displeases the states of Greece.

Athens

Thebes.
37
A combination
against
Thebes.

38
Epaminondas makes
an unsuccessful attempt
on
Sparta,

39
And on
Mantineia.

40
Battle of
Mantineia.

Athens and Sparta were accordingly applied to, and were easily prevailed upon to assist the Mantineans, and to come into a strict confederacy against the Thebans; and to prevent all disputes about the command of the army, it was agreed that each state should have it in its own territories; which plainly shows how terrified they all were at the apprehension of a fresh invasion of the Thebans: for this was a point which neither the Spartans nor Athenians would have so readily given up to the Arcadians, though these had formerly as strenuously insisted upon it, even when they were almost reduced to the last extremity, and had never been able to obtain it till now. But Epaminondas was then in full march at the head of his Boeotian troops, with some Eubœan auxiliaries, and a body of stout Thessalian horse; and was moreover to be joined by the Messenians, Argives, and several other nations, as soon as he had entered Peloponnesus. The confederate army against him had ordered their rendezvous at Mantinea, the place which they naturally concluded would be first attacked, as being the chief seat of those who had revolted from the Thebans. But whilst they were securing themselves on that side, Epaminondas, who wisely considered how far this confederacy and expedition must have drained the city of Sparta of its main strength, broke up privately from Nemæa, where he had lain for some time encamped, and marched all that night with a design to have surprised that important capital: but his project being timely discovered, the vigilant king took care to disconcert it; so that, though the Theban general made several vigorous assaults on that city, he was so stoutly repulsed, and the Spartans behaved with such intrepid valour, that he was forced to retire and turn his thoughts against Mantinea, which he judged by this time to have been quite defenceless. He judged rightly indeed; for the place was not only drained of its troops, but likewise of its inhabitants, who took that opportunity, whilst the scene of war was in Lacedæmon, to gather in their harvest, and were scattered all over the country; so that he would not have met with any difficulty in gaining the town, had not the Athenian auxiliaries come unexpectedly to its relief, and given him a fresh repulse.

These two last defeats greatly exasperated the Theban general, who had never till now been used to them, and could not but foresee that they would not only lessen his reputation with his allies, but, if not timely retrieved, would fully the glory of all his former exploits. What added to his present difficulties was, that the time allotted him for his expedition was almost expired; so that he had but a short space left to undertake some brave achievement, which might recover his and his country's honour, and keep up the spirits of his auxiliaries and those under his protection. He was moreover got very far into the enemy's country, and saw plainly enough how narrowly they watched all his motions, and how well prepared they were to oppose him whatever attempt he resolved upon, whether to attack them or to retreat. Under all these difficulties, he rightly considered, that he must immediately resolve upon a decisive battle; in which, if his pristine fortune followed him, he might at once retrieve his affairs, and make himself master of Peloponnesus; or, if that failed him, as it lately had done, fall honourably in the attempt. In this engagement Epaminondas made the wisest disposition of his troops, attacked and fought with the most intrepid courage and conduct, and had opened himself a way through the Spartan phalanxes, thrown them into the utmost confusion, and made a terrible slaughter of them, insomuch that the field of battle was covered with their wounded and slain, when, in the heat of the fight, having ventured himself too far in order to give them a total overthrow, the enemy rallied again, pour-

ing with their whole fury three volleys of darts at him, Thebes.
some of which he drew out and returned to them, till at length, being covered with wounds, and weakened with the loss of so much blood, he received a mortal wound from a javelin, and was with great difficulty rescued from the enemy by his brave Thebans, and brought alive, though speechless, into his tent. As soon as he had recovered himself, he asked his friends that were about him what was become of his shield; and being told that it was safe, he beckoned to have it brought to him, and kissed it. He next inquired which side had gained the victory; and being answered, The Thebans; he replied, Then all is well: and upon observing some of his friends bewail his untimely death, and leaving no children behind him, he is said to have answered, Yes; I have left two fair daughters, the victory of Leuctra, and this of Mantinea, to perpetuate my memory. Soon after this, upon drawing the point of the javelin out of his body, he expired.

The consequence of this great general's fall, and of this bloody fight, in which neither side could boast any great advantage over the other, but a great loss of men on both sides, insomuch that Xenophon makes it a drawn battle, was, that both parties agreed on a cessation of arms, and parted, as it were by consent, to take care of their wounded and slain. The Thebans indeed thus far gained the greater share of glory, that they renewed the fight, and after a most desperate contest, gained the victory over those Spartans that opposed them, and rescued the body of their dying general out of their hands. However, an effectual end was put to this bloody war, and a general peace agreed on by all but Sparta; who refused it only because the Messenians were included in it. But as to the Thebans, they had no great reason to boast of this dear-bought victory, since their power and glory began to decline from that very time; so that it may be truly said, that it rose and set with their great general.

On the death of Epaminondas, the Thebans relapsed into their former state of inactivity and indolence; and at last having ventured to oppose Alexander the Great, their city was taken, and the inhabitants slaughtered for several hours, after which the buildings were destroyed. It was rebuilt by Cassander, but never afterwards made any considerable figure among the states of Greece. About the year 146 B. C. it fell under the power of the Romans, under which it continued till the extinction of their empire by the Turks. It is now called *Thive*, and is nothing to what it was formerly; yet it is four miles in circumference, but so full of ruins, that there are not above 4000 Turks and Christians in it. It is now famous for a fine sort of white clay, of which they make bowls for pipes after the Turkish fashion. They are never burnt, but dry naturally, and become as hard as a stone. There are two mosques in Thebes, and a great many Greek churches. It is seated between two small rivers, in E. Long. 23. 40. N. Lat. 38. 17.

THEBES, in Egypt, one of the most renowned cities of the ancient world. It was also called *Diospolis*, or the city of Jupiter, and was built, according to some, by Osiris, according to others by Busiris. Its length, in Strabo's time, was 80 furlongs, or ten miles; but this was nothing in comparison of its ancient extent, before it was ruined by Cambyses, which, we are told, was no less than 400 stadia, or 52 miles and an half. The wealth of this city was so great, that, after it had been plundered by the Persians, what was found, on burning the remains of the pillage, amounted to above 300 talents of gold and 2300 of silver.

Mr Bruce visited the ruins of this celebrated city; but informs us that nothing now remains except four temples, and these neither so entire nor magnificent as some others at

Thebes.
41
Epaminondas killed.

42
Peace concluded.

43
State of Thebes to the present time.

Ancient Universal History, vol. i.

Thebes,
Theft.Bruce's
Travels.

a place called *Dendera*. Thebes has been celebrated by Homer for its hundred gates; but Mr Bruce informs us, that no vestiges of these are now remaining, neither can we discover the foundation of any wall it ever had; "and as for the horsemen and chariots it is said to have sent out, all the Thebaid sown with wheat would not have maintained one half of them. Thebes, at least the ruins of the temples called *Medinet Tabu*, are built in a long stretch of about a mile broad, most parsimoniously chosen at the sandy foot of the mountains. The *Horti Pensiles*, or hanging gardens, were surely formed upon the sides of these hills, then supplied with water with mechanical devices. The utmost is done to spare the plain, and with great reason; for all the space of ground this ancient city has had to maintain its myriads of horses and men, is a plain of three quarters of a mile broad between the town and the river, upon which plain the water rises to the height of four and five feet. All this pretended populousness of ancient Thebes I therefore believe to be fabulous."

Mr Bruce, after examining the ground on which Thebes is supposed to have stood, thinks that it had no walls, and that consequently Homer's story of its having an hundred gates is misunderstood. The mountains of the Thebaid stand close behind the town, not in a ridge, but standing single, so that you can go round each of them. A hundred of these are said to be hollowed out for sepulchres and other purposes. These, he thinks, were the hundred gates of Homer; in proof of this they are still called by the natives *Beeban el Meluke*, "the ports or gates of the kings."

All that is said of Thebes by poets or historians after the days of Homer is meant of Diospolis, which was built by the Greeks long after Thebes was destroyed, as its name testifies; though Diodorus says it was built by Busiris. It was on the east side of the Nile, whereas ancient Thebes was on the west, though both are considered as one city; and Strabo says, that the river runs through the middle of Thebes, by which he means between Old Thebes and Diospolis.

THEFT, or **SIMPLE LARCENY**, is "the felonious taking and carrying away of the personal goods of another." This offence certainly commenced then, whenever it was that the bounds of property, or laws of *meum* and *tuum*, were established. How far such an offence can exist in a state of nature, where all things are held to be common, is a question that may be solved with very little difficulty. The disturbance of any individual in the occupation of what he has seized to his present use, seems to be the only offence of this kind incident to such a state. But, unquestionably, in social communities, when property is established, any violation of that property is subject to be punished by the laws of society; though how far that punishment should extend is matter of considerable doubt.

By the Jewish law it was only punished with a pecuniary fine, and satisfaction to the party injured; and in the civil law, till some very late constitutions, we never find the punishment capital. The laws of Draco at Athens punished it with death: but his laws were said to be written with blood; and Solon afterwards changed the penalty to a pecuniary mulct. And so the Attic laws in general continued; except that once, in a time of dearth, it was made capital to break into a garden and steal figs: but this law, and the informers against the offence, grew so odious, that from them all malicious informers were styled *sycophants*; a name which we have much perverted from its original meaning. From these examples, as well as the reason of the thing, many learned and scrupulous men have questioned the propriety, if not lawfulness, of inflicting capital punishment for simple theft. And certainly the natural punishment for injuries to

property seems to be the loss of the offender's own property; which ought to be universally the case, were all men's fortunes equal. But as those who have no property themselves are generally the most ready to attack the property of others, it has been found necessary, instead of a pecuniary, to substitute a corporal punishment; yet how far this corporal punishment ought to extend, is what has occasioned the doubt. Sir Thomas More and the Marquis Beccaria, at the distance of more than two centuries, have very sensibly proposed that kind of corporal punishment which approaches the nearest to a pecuniary satisfaction, viz. a temporary imprisonment, with an obligation to labour, first for the party robbed, and afterwards for the public, in works of the most slavish kind; in order to oblige the offender to repair, by his industry and diligence, the depredations he has committed upon private property and public order. But, notwithstanding all the remonstrances of speculative politicians and moralists, the punishment of theft still continues throughout the greater part of Europe to be capital: and Puffendorf, together with Sir Matthew Hale, are of opinion that this must always be referred to the prudence of the legislature; who are to judge, say they, when crimes are become so enormous as to require such sanguinary restrictions. Yet both these writers agree, that such punishment should be cautiously inflicted, and never without the utmost necessity.

The Anglo Saxon laws nominally punished theft with death, if above the value of twelvepence: but the criminal was permitted to redeem his life by a pecuniary ransom; as, among their ancestors the Germans, by a stated number of cattle. But in the 9th year of Henry I. this power of redemption was taken away, and all persons guilty of larceny above the value of twelvepence were directed to be hanged; which law continues in force to this day. For though the inferior species of theft, or petit larceny, is only punished by whipping at common law, or (by stat. 4 Geo. I. c. 11.) may be extended to transportation for seven years, as is also expressly directed in the case of the Plate-glass Company; yet the punishment of grand larceny, or the stealing above the value of twelvepence (which sum was the standard in the time of king Athelstan, 800 years ago), is at common law regularly death: which, considering the great intermediate alteration in the price or denomination of money, is undoubtedly a very rigorous constitution; and made Sir Henry Spelman (above a century since, when money was at twice its present rate) complain, that while every thing else was risen in its nominal value, and become dearer, the life of man had continually grown cheaper. It is true, that the mercy of juries will often make them strain a point, and bring in larceny to be under the value of twelvepence, when it is really of much greater value: but this, though evidently justifiable and proper when it only reduces the present nominal value of money to the ancient standard, is otherwise a kind of pious perjury, and does not at all excuse our common law in this respect from the imputation of severity, but rather strongly confesses the charge. It is likewise true, that by the merciful extensions of the benefit of clergy by our modern statute-law, a person who commits a simple larceny to the value of thirteen pence or thirteen hundred pounds, though guilty of a capital offence, shall be excused the pains of death; but this is only for the first offence. And in many cases of simple larceny the benefit of clergy is taken away by statute: as from house-stealing in the principals and accessories both before and after the fact; theft by great and notorious thieves in Northumberland and Cumberland; taking woollen cloth from off the tenters, or linens, fustians, calicoes, or cotton goods, from the place of manufacture (which extends, in the last case, to aiders, as-

Theft.

sisters,

Theft ^{||}
Theobald. ^{||} ^{||}
sifters, procurers, buyers, and receivers); feloniously driving away, or otherwise stealing one or more sheep or other cattle specified in the acts, or killing them with intent to steal the whole or any part of the carcase, or aiding or assisting therein; thefts on navigable rivers above the value of forty shillings, or being present, aiding and assisting thereat; plundering vessels in distress, or that have suffered shipwreck; stealing letters sent by the post; and also stealing deer, hares, and conies, under the peculiar circumstances mentioned in the Waltham black act. Which additional severity is owing to the great malice and mischief of the theft in some of these instances; and, in others, to the difficulties men would otherwise lie under to preserve those goods, which are so easily carried off. Upon which last principle the Roman law punished more severely than other thieves the *Abigei* or stealers of cattle, and the *Balnearii* or such as stole the clothes of persons who were washing in the public baths; both which constitutions seem to be borrowed from the laws of Athens. And, so too, the ancient Goths punished with unrelenting severity thefts of cattle, or of corn that was reaped and left in the field: such kind of property (which no human industry can sufficiently guard) being esteemed under the peculiar custody of heaven.

THEFT-BOTE (from the Saxon *theof*, i. e. *fur*, and *bote*, *compensatis*), is the receiving of a man's goods again from a thief, after stolen, or other amends not to prosecute the felon, and to the intent the thief may escape; which is an offence punishable with fine and imprisonment, &c.

THELIGONUM, in botany: A genus of plants belonging to the class of *monœcia*, and order of *polyandria*; and in the natural system ranging under the 53d order, *Scabridæ*. The male calyx is bifid; there is no corolla; the stamina are generally 12. The female calyx is also bifid; there is no corolla; only one pistil; the capsule is coriaceous, unilocular, and monospermous. There is only one species, the *Cynocrambe*, which is indigenous in the south of Europe.

THEME, denotes the subject of an exercise for young students to write or compose on.

THEMISON, a physician of Laodicea, a disciple of Asclepiades. He founded the methodic sect, with a view to the more easily teaching and practising the art of medicine. (See **MEDICINE**, n° 37). Themison gave the first account of diacodium, which was prepared of the juice and decoction of poppy-heads and honey. He invented a purging medicine called *heira*.

THEMISTIUS, an ancient Greek orator and philosopher, a native of Paphlagonia, who flourished in the 4th century. He had great interest and favour with the emperors in his time, and though a heathen, was of a very tolerating spirit. He taught for many years at Constantinople, of which city he was made præfect, by Julian and Theodosius; and lived to be exceedingly old. More than 30 of his orations are still extant, beside commentaries on several parts of Aristotle's works.

THEMISTOCLES, the renowned Athenian admiral, general, and patriot, who gained the battle of Salamis against the Persians. Being banished his country by his ungrateful fellow-citizens, he fled to Artaxerxes king of Persia: but, in order to avoid taking up arms against his country, he slew himself, 464 B. C. See **ATTICA**, n° 76, *et seq.*

THEOBALD (Lewis), the son of an attorney at Sittingbourne in Kent, was a well-known writer and critic in the early part of the present century. He engaged in a paper called the *Censor*, published in *Mist's Journal*, wherein, by delivering his opinions with too little reserve concerning some eminent wits, he exposed himself to their resentment. Upon the publication of Pope's *Homer*, he praised it in terms of extravagant admiration, yet afterwards

thought proper to abuse it as earnestly; for which Pope at first made him the hero of his *Dunciad*, though he afterward laid him aside for another. Mr Theobald not only exposed himself to the lashes of Pope, but waged war with Mr Dennis, who treated him more roughly, though with less satire. He nevertheless published an edition of Shakespeare, in which he corrected, with great pains and ingenuity, many faults that had crept into that poet's writings. This edition is still in great esteem; being in general preferred to those published by Pope, Warburton, and Hanmer. He also wrote some plays, and translated others from the ancients.

THEOBROMA, in botany: A genus of plants belonging to the class of *polyadelphia*, and order of *pentandria*; and in the natural system ranging under the 37th order, *Columniferæ*. The calyx is triphyllous; the petals, which are five in number, are vaulted and two-horned; the nectarium is pentaphyllous and regular; the stamina grow from the nectarium, each having five antheræ. There are three species; the *cacao*, *guazuma*, and *angusta*.

The *cacao*, or chocolate tree, we shall describe in the words of Dr Wright: "In all the French and Spanish islands and settlements in the warmer parts of America, the chocolate tree is carefully cultivated. This was formerly the case also in Jamaica; but at present we have only a few straggling trees left as monuments of our indolence and bad policy."

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Medical
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"This tree delights in shady places and deep valleys. It is seldom above 20 feet high. The leaves are oblong, large, and pointed. The flowers spring from the trunk and large branches; they are small, and pale red. The pods are oval and pointed. The seeds or nuts are numerous, and curiously stowed in a white pithy substance."

"The cocoa-nuts being gently parched in an iron pot over the fire, the external covering separates easily. The kernel is levigated on a smooth stone; a little annatto is added, and with a few drops of water is reduced to a mass, and formed into rolls of one pound each. This simple preparation is the most natural, and the best. It is in daily use in most families in Jamaica, and seems well adapted for rearing of children." See **CHOCOLATE**.

THEOCRACY, in matters of government, a state governed by the immediate direction of God alone: such was the ancient government of the Jews before the time of Saul.

THEOCRITUS, the father of pastoral poetry, was born at Syracuse in Sicily. Two of his poems ascertain his age; one addressed to Hiero king of Syracuse, who began his reign about 275 years before Christ; and the other to Ptolemy Philadelphus king of Egypt. Hiero, though a prince distinguished in arms and political wisdom, does not seem to have been a patron of learning. This is supposed to have given birth to the 16th Idyllium. From Syracuse Theocritus went to Alexandria, where he seems to have found a munificent patron in Ptolemy Philadelphus, if we may judge from the panegyric which he composed on that prince (the 17th Idyllium). It has been said that Theocritus was strangled by Hiero, but we have not found evidence of this.

The compositions of this poet are distinguished, among the ancients, by the name of *Idylliums*, in order to express the smallness and variety of their natures: they would now be called *Miscellanies*, or *Poems on several Occasions*. The first nine and the eleventh are confessed to be true pastorals, and hence Theocritus has usually passed for nothing more than a pastoral poet; yet he is manifestly robbed of a great part of his fame, if his other poems have not their proper laurels. For though the greater part of his Idylliums cannot be called the songs of shepherds, yet they have certainly their

Theodolite, their respective merits. His pastorals ought to be considered as the foundation of his credit; upon this claim he will be admitted for the finisher as well as the inventor of his art, and will be acknowledged to have excelled all his imitators as much as originals usually do their copies.

The works of this poet were first published in folio by Aldus Manutius at Venice in 1495. A more elegant and correct edition was printed by Henry Stephens at Paris in 1566. An edition was published at Leipzig in 1765, with valuable notes by the learned Reiske. But what will most highly gratify the admirers of pastoral poetry, is an edition published in 1770, 2 vols 4to, by Mr Thomas Warton. It is accompanied by the scholia of the best editors, and the different readings of 15 MSS.

THEODOLITE, a mathematical instrument for measuring heights and distances. See **GEOMETRY**, p. 679.

THEODORE, king of Corsica, baron Nicuhoft in the county of La Marc in Westphalia. He had his education in the French service, and afterwards went to Spain, where he received some marks of regard from the duke of Riparda and cardinal Alberoni; but being of an unsettled disposition, he quitted Spain, and travelled into Italy, England, and Holland, in search of some new adventure. He at last fixed his attention on Corsica, and formed the scheme of rendering himself sovereign of that island. He was a man of abilities and address; and having fully informed himself of every thing relating to Corsica, went to Tunis, where he fell upon means to procure some money and arms; and then went to Leghorn, from whence he wrote a letter to the Corsican chiefs Giafferi and Paoli, offering considerable assistance to the nation if they would elect him as their sovereign. This letter was consigned to Count Domenico Rivarola, who acted as Corsican plenipotentiary in Tuscany; and he gave for answer, that if Theodore brought the assistance he promised to the Corsicans, they would very willingly make him king.

Upon this he, without loss of time, set sail, and landed at Tavagna in the spring of the year 1736. He was a man of a very stately appearance, and the Turkish dress he wore added to the dignity of his mien. He had a few attendants with him; and his manners were so engaging, and his offers so plausible, that he was proclaimed king of Corsica before Count Rivarola's dispatches arrived to inform the chiefs of the terms upon which he had agreed. He brought with him about 1000 sequins of Tunis, beside some arms and ammunition, and made magnificent promises of foreign assistance; whence the Corsicans, who were glad of any support, willingly gave into his schemes. Theodore instantly assumed every mark of royal dignity. He had his guards and his officers of state; he conferred titles of honour, and struck money both of silver and copper. The silver pieces were few in number, and can now hardly be met with; the copper coins have on one side T. R. that is, "Theodorus Rex," with a double branch crossed, and round it this inscription, PRO BONO PUBLICO RE. CO. that is, "For the public good of the kingdom of Corsica:" on the other side is the value of the piece; *Cinque solidi*, or five sours.

The Genoese were not a little confounded with this unexpected adventurer. They published a violent manifesto against Theodore, treating him with great contempt; but at the same time showing they were alarmed at his appearance. Theodore replied, in a manifesto, with all the calmness and dignity of a monarch; but after being about eight months in Corsica, perceiving that the people began to cool in their affections towards him, he assembled his chiefs, and declared he would keep them no longer in a state of uncertainty, being determined to seek in person the support he so

long expected. He settled an administration during his absence, recommended unity in the strongest terms, and left the island with reciprocal assurances of fidelity and affection. He went to Holland, where he was so successful as to obtain credit from several rich merchants, particularly Jews, who trusted him with cannon and other warlike stores to a great value, under the charge of a supercargo. With these he returned to Corsica in 1739; but by this time the French, as auxiliaries to the Genoese, had become so powerful in the island, that though Theodore threw in his supply of warlike stores, he did not incline to venture his person, the Genoese having set a high price on his head. He therefore again departed; and after many unavailing attempts to recover his crown, at length chose for retirement a country where he might enjoy the participation of that liberty which he had so vainly endeavoured to give his Corsicans; but his situation in England by degrees grew wretched, and he was reduced so low as to be several years before his death a prisoner for debt in the King's Bench. At length, to the honour of some gentlemen of rank, a charitable contribution was set on foot for him in the year 1753. Mr Boswell observes, that Mr Horace Walpole generously exerted himself for the unhappy Theodore, and wrote a paper in *The World* with great elegance and humour, soliciting a contribution for the unhappy monarch in distress, to be paid to Mr Robert Dodsley bookseller, as lord high treasurer. This brought him a very handsome sum, and he was set at liberty. That gentleman adds, that Mr Walpole has the original deed, by which Theodore made over the kingdom of Corsica in security to his creditors, and that he has also the great seal of the kingdom. Theodore died in 1756, and was buried in St Anne's churchyard, Westminster; where, in 1757, a simple undorned monument of marble was erected to his memory by a gentleman, with an inscription; which, after mentioning some of the above particulars, concludes with the following lines:

The grave, great teacher, to a level brings
Heroes and beggars, galley-slaves and kings;
But Theodore this moral learn'd ere dead,
Fate pour'd its lesson on his living head,
Bestow'd a kingdom and deny'd him bread.

Theodore left a son, who was an accomplished gentleman. **THEODORET**, bishop of St Cyricus in Syria, in the 4th century, and one of the most learned fathers of the church, was born in the year 386, and was the disciple of Theodorus Mopsuestia and St John Chrysostom. Having received holy orders, he was with difficulty persuaded to accept of the bishopric of St Cyricus, about the year 420. He discovered great frugality in the expences of his table, dress, and furniture, but spent considerable sums in improving and adorning the city of Cyricus. He erected two large bridges, public baths, fountains, and aqueducts, and laboured with great zeal and success in his diocese. Yet his zeal was not confined to his own church: he went to preach at Antioch and the neighbouring towns; where he became admired for his eloquence and learning, and had the happiness to convert multitudes of people. He wrote in favour of John of Antioch and the Nestorians, against Cyril's Twelve Anathemas: he afterwards attacked the opinions of Nestorius, and was deposed in the synod held by the Eutychians at Ephesus; but was again restored by the general council of Chalcedon, in which he was present, in 451. It is thought that he died soon after; though others say that he lived till the year 457. There are still extant Theodore's excellent Commentary on St Paul's Epistles, and on several other books of the Holy Scriptures. 2. His Ecclesiastical History from the time of Arius to Theodosius the

Theodore,
Theodore.

Theodosius, the Younger. 3. The history of the famous Anchorites of his time. 4. Epistles. 5. Discourses on Providence. And, 6. An excellent treatise against the Pagans, intitled, *De Curandis Græcorum Affectionibus*; and other works. The best edition of all which is that of Father Sirmond in Greek and Latin, in 4 vols folio.

THEODOSIUS I. called the *Great*, was a native of Spain. The valour he had shown, and the great services he had done to the empire, made Gratian, attacked by the Goths and Germans, to admit him as a partner in the government. He received the purple in 379, aged 43. See CONSTANTINOPLE, n° 77—88.

THEOGONY, formed from *Θεός* God, and *γενετήρ* genitura,

"seed, offspring," that branch of the heathen theology ^{Theognis.} which taught the genealogy of their gods.

Hesiod gives us the ancient theogony, in a poem under that title. Among the most ancient writers, Dr Burnet observes, that theogony and cosmogony signified the same thing. In effect, the generation of the gods of the ancient Persians, fire, water, and earth, is apparently no other than that of the primary elements.

THEOGNIS, an ancient Greek poet of Megara in Achaia, flourished about the 59th Olympiad, 144 B. C. We have a moral work of his extant, containing a summary of precepts and reflections, usually to be found in the collections of the Greek minor poets.

T H E O L O G Y

¹ **Definition.** IS a Greek word (*θεολογία*), and signifies that science which treats of the being and attributes of God, his relations to us, the dispensations of his providence, his will with respect to our actions, and his purposes with respect to our end. The word was first used to denote the systems, or rather the heterogeneous fables, of those poets and philosophers who wrote of the genealogy and exploits of the gods of Greece. Hence Orpheus, Museus, Hesiod, Pherecydes, and Pythagoras, were called *theologians*; and the same epithet was given to Plato, on account of his sublime speculations on the same subject. It was afterwards adopted by the earliest writers of the Christian church, who styled the author of the apocalypse, by way of eminence, *ὁ θεολόγος*, the *Divine*.

Although every pagan nation of antiquity had some tutelary deities peculiar to itself, they may yet be considered as having all had the same theology, since an intercommunity of gods was universally admitted, and the heavenly bodies were adored as the *dii majorum gentium* over the whole earth. This being the case, we are happily relieved from treating, in the same article, of the truths of Christianity and the fictions of paganism, as we have elsewhere traced idolatry from its source, and shewn by what means "the foolish hearts of men became so darkened that they changed the glory of the incorruptible God into an image made like to corruptible man, and to birds, and four-footed beasts, and creeping things." See POLYTHEISM.

² **Christian theology.** The absurdities and inconsistency of the pretended revelation of the Arabian impostor have been sufficiently exposed under the words ALCORAN and MAHOMETANISM; so that the only theology of which we have to treat at present is *Christian* theology, which comprehends that which is commonly called *natural*, and that which is *revealed* in the scriptures of the Old and New Testaments. These taken together, and they ought never to be separated, compose a body of science so important, that in comparison with it all other sciences sink into insignificance; for without a competent knowledge of the attributes of God, of the several relations in which he stands to us, and of the ends for which we were created, it is obvious that we must wander through life like men groping in the dark, strangers to the road on which we are travelling, as well as to the fate awaiting us at the end of our journey.

³ **To be studied carefully by those intended for the service of the church.** But if this knowledge be necessary to all Christians, it is doubly so to those who are appointed to feed the flock of Christ, and to teach the ignorant what they are to believe, and what to do, in order to work out their own salvation. The wisdom and piety of our ancestors have accordingly founded professorships of theology in all our universities, where the principles of our religion are taught in a systematical manner; and the church has ordained, that no man shall be admitted to the office of a preacher of the gospel who has not attended a regular course of such theological lectures.

It must not, however, be supposed, that, by merely listening to a course of lectures however able, any man will become an accomplished divine. The principles of this science are to be found only in the word and works of God; and he who would extract them pure and unsophisticated, must dig for them himself in that exhaustless mine. To fit a man for this important investigation, much previous knowledge is requisite. He must study the works of God scientifically before he can perceive the full force of that testimony which they bear to the power, the wisdom, and the goodness of their author. Hence the necessity of a general acquaintance with the physical and mathematical sciences before a man enter upon the proper study of theology, for he will not otherwise obtain just and enlarged conceptions of the God of the universe. See PHYSICS, n° 115.

But an acquaintance with the physical and mathematical sciences is not alone a sufficient preparation for the study of theology. Indeed it is possible for a man to devote himself to wholly to any of these sciences, as to make it counteract the only purposes for which it can be valuable to the divine; for he who is constantly immersed in matter, is apt to suspect that there is no other substance; and he who is habituated to the routine of geometrical demonstration, becomes in time incapable of reasoning at large, and estimating the force of the various degrees of moral evidence. To avert these untoward consequences, every man, before he enter upon the study of that science which is the subject of the present article, should make himself acquainted with the principles of logic, the several powers of the human mind, and the different sources of evidence; in doing which he will find the greatest assistance from Bacon's *Novum Organum*, Locke's *Essay on the Human Understanding*, Reid's *Essays on the Intellectual and Active Powers of Man*, and Tatham's *Chart and Scale of Truth*. These works, of which the young student ought to make himself master, will teach him to think justly, and guard him against a thousand errors, which those who have not laid such a foundation are apt to embrace as the truths of God.

The man who proposes to study theology ought to have it in view, as the ultimate end of his labours, to impart to others that knowledge which he may procure for himself. "Amongst the many marks which distinguish the *Christian* philosopher from the *Pagan*, this (says a learned writer *) is one of the most striking—the *Pagan* sought knowledge in a selfish way, to secrete it for his own use; the *Christian* seeks it with the generous purpose (first in view, though last in execution)

4 ^{Previous knowledge requisite for the prosecution of this study.}

3 G

Introduction.

execution) to impart it to others. The Pagan philosopher, therefore, having cultivated the *art of thinking*, proceeds to that of *speaking*, in order to display his vanity in the dexterous use of deceit. On the other hand, the *Christian philosopher* cultivates the *art of speaking*, for the sole purpose of disseminating the truth in his office of preacher of the gospel."

As every man, before he enters upon the proper study of theology, receives, at least in this country, the rudiments of a liberal education, it may perhaps be superfluous to mention here any books as peculiarly proper to teach him the art of speaking: we cannot however forbear to recommend to our student the attentive perusal of Quintilian's *Institutions*, and Dr Blair's *Lectures on Rhetoric and the Belles Lettres*. A familiar acquaintance with these works will enable him, if he be endowed by nature with talents fit for the office in which he proposes to engage, to express his thoughts with correctness and elegance; "without which, it has been well observed, that science, especially in a clergyman, is but learned lumber, a burden to the owner, and a nuisance to every body else."

No man can proceed thus far in the pursuits of general science without having been at least initiated in the learned languages; but he who intends to make theology his profession should devote himself more particularly to the study of Greek and Hebrew, because in these tongues the original scriptures are written. By this we do not mean to insinuate that it is necessary for the man whose views aspire no farther than to the office of pastor of a Christian congregation, to make himself a profound critic in either of these ancient languages. The time requisite for this purpose is so long, that it would leave very little for other studies of infinitely more importance to him, whose proper business it is to instruct the ignorant in those plain and simple truths which are sufficient to guide all men in the way to salvation. Still, however, it is obvious, that he who is incapable of consulting the original scriptures, must rest his faith, not upon the sure foundation of the word of God, but upon the credit of fallible translators; and if he be at any time called upon to vindicate revelation against the scoffs of infidelity, he will have to struggle with many difficulties which are easily solved by him who is master of the original tongues.

5
Cautions to be observed in attending the lectures of a professor.

The student having laid in this stock of preparatory knowledge, is now qualified to attend with advantage the theological lectures of a learned professor; but in doing this, he should be very careful neither to admit nor reject any thing upon the bare authority of his master. Right principles in theology are of the utmost importance, and can rest upon no authority inferior to that of the word of God. On this account we have long been of opinion, that a professor cannot render his pupils so much service by a systematical course of lectures, as by directing their studies, and pointing out the road in which they may themselves arrive in the shortest time at the genuine sense of the sacred scrip-

tures. In this opinion we have the honour to agree with the ablest lecturer § in theology that we have ever heard. The authors of all systems are more or less prejudiced in behalf of some particular and artificial mode of faith. He, therefore, who begins with the study of them, and afterwards proceeds to the sacred volume, sees with a jaundiced eye every text supporting the peculiar tenets of his first master, and acts as absurd a part as he who tries not the gold by the copel, but the copel by the gold. Before our young divine, therefore, sit down to the serious perusal of any one of those *institutes* or *bodies of theology* which abound in all languages, and even before he read that which the nature of our work compels us to lay before him, we beg leave, with the utmost deference to the superior judgment of our more learned readers, to recommend to his consideration the following

PRELIMINARY DIRECTIONS FOR THE STUDY OF THEOLOGY.

CHRISTIAN theology is divided into two great parts, *natural* and *revealed*; the former comprehending that which may be known of God from the creation of the world, even his eternal power and Godhead; the latter, that which is discovered to man nowhere but in the sacred volume of the Old and New Testaments.

Concerning the extent of natural theology many opinions have been formed, whilst some have contended that there is no such thing. Into these disputes we mean not at present to enter. We believe that one of them could have had no existence among sober and enlightened men, had the contending parties been at due pains to define with accuracy the terms which they used. Whatever be the origin of religion, which we have endeavoured to ascertain elsewhere (see RELIGION, n° 6—17.), it is obvious, that no man can receive a written book as the word of God till he be convinced by some other means that God exists, and that he is a Being of power, wisdom, and goodness, who watches over the conduct of his creature man. If the progenitor of the human race was instructed in the principles of religion by the Author of his being (a fact of which it is difficult to conceive how a consistent theist can entertain a doubt), he might communicate to his children, by natural means, much of that knowledge which he himself could not have discovered had he not been supernaturally enlightened. Between illustrating or proving a truth which is already talked of, and making a discovery of what is wholly unknown, every one perceives that there is an immense difference (A).

To beings whose natural knowledge originates wholly from sensation, and whose minds cannot, but by much discipline, advance from sense to science, a long series of revelations might be necessary to give them at first just notions of God and his attributes, and to enable them to perceive the

(A) The discriminating powers of Aristotle will not be questioned; and in the following extract made by Cicero from some of his works which are now lost, he expresses our sentiments on this important subject with his usual precision:—"Præclare ergo Aristoteles, si ESSENT, inquit, qui sub terra semper habitavissent, bonis, et illustribus domiciliis, quæ essent ornata signis atque picturis, instructaque rebus iis omnibus, quibus abundant ii, qui beati putantur, nec tamen exissent unquam supra terram: ACCEPISSENT AUTEM FAMA ET AUDITIONE, ESSE QUODDAM NUMEN, ET VIM DEORUM; deinde aliquo tempore, patefactis terræ faucibus, ex illis abditis sedibus evadere in hæc loca, quæ nos incolimus, atque exire potuissent: cum repente terram, et maria, cælumque vidissent: nubium magnitudinem, ventorumque vim cognovissent, adspexissentque solem, ejusque tum magnitudinem, pulchritudinemque, tum etiam efficientiam cognovissent, quod is diem efficeret, toto cælo luce diffusa: cum autem terras nox opacasset, tum cælum totum cernerent astris distinctum et ornatum, lunæque luminum varietatem tum crescentis, tum senescentis, eorumque omnium ortus et occasus, atque in omni æternitate ratos, immutabilesque cursus: hæc cum viderent, PROPECTO ET ESSE DEOS, et HÆC TANTA OPERA DEORUM ESSE arbitrarentur." *De Nat. Deorum*, lib. ii. § 37.

From

Preliminary Directions. the relation between the effect and its cause, so as to infer by the powers of their own reason the existence of the Creator from the presence of his creatures. Such revelations, however, could be satisfactory only to those who immediately received them. Whenever the Deity has been pleased by supernatural means to communicate any information to man, we may be sure that he has taken effectual care to satisfy the person so highly favoured that his understanding was not under the influence of any illusion; but such a person could not communicate to another the knowledge which he had thus received by any other means than an address to his rational faculties. No man can be required to believe, no man indeed can believe, without proof, that another, who has no more faculties either of sensation or intellect than himself, has obtained information from a source to which he has no possible access. An appeal to miracles would in this case serve no purpose; for we must believe in the existence, power, wisdom, and justice, of God, before a miracle can be admitted as evidence of any thing but the power of him by whom it is performed. See MIRACLE.

9 And yet may be properly termed natural principles. It is therefore undeniable that there are some principles of theology which may be called *natural*; for though it is in the highest degree probable that the parents of mankind received all their theological knowledge by *supernatural* means, it is yet obvious that some parts of that knowledge must have been capable of a proof purely rational, otherwise not a single religious truth could have been conveyed through the succeeding generations of the human race but by the immediate inspiration of each individual. We indeed admit many propositions as certainly true, upon the sole authority of the Jewish and Christian scriptures, and we receive these scriptures with gratitude as the lively oracles of God; but it is self-evident that we could not do either the one or the other, were we not convinced by natural means that God exists, that he is a Being of goodness, justice, and power, and that he inspired with divine wisdom the penmen of these sacred volumes. Now, though it is very possible that no man or body of men, left to themselves from infancy in a desert world, would ever have made a theological discovery; yet whatever propositions relating to the being and attributes of the first cause and the duty of man, can be demonstrated by human reason, independent of written revelation, may be called *natural theology*, and are of the utmost importance, as being to us the first principles of all religion. Natural theology, in this sense of the word, is the foundation of the Christian revelation; for without a previous knowledge of it, we could have no evidence that the scriptures of the Old and New Testaments are indeed the word of God.

10 Natural theology to be studied before the doctrines of revelation. Our young divine, therefore, in the regular order of his studies, ought to make himself master of *natural theology* before he enters upon the study of *revelation*.

Preliminary Directions. fore he enter upon the important task of searching the scriptures. On this subject many books have been published in our own and other languages; but perhaps there is none more worthy of attention than the Religion of Nature delineated by Mr Wollaston (B). It is a work of great merit, and bears ample testimony to its author's learning and acuteness: yet we think it ought to be read with caution. Mr Wollaston's theory of moral obligation is fanciful and groundless; and whilst we readily acknowledge that he demonstrates many truths with elegance and perspicuity, we cannot deny that he attempts a proof of others, for which we believe no other evidence can be brought than the declarations of Christ and his apostles in the holy scriptures. To supply the defects of his theory of morals, we would recommend to the student an attentive perusal of Cumberland on the Law of Nature, and Paley's Elements of Moral Philosophy. A learned author* affirms of Cumberland, that "he excels all men in fixing the true grounds of moral obligation, out of which natural law and natural religion both arise;" and we have ourselves never read a work in which the various duties which a man owes to his Maker, himself, and his fellow-creatures, are more accurately stated or placed on a surer basis than in the moral treatise of the archdeacon of Carlisle.

As Wollaston demonstrates with great perspicuity, and to the absolute conviction of every man capable of feeling the force of argument, the being and many of the attributes of God, it may perhaps appear superfluous to recommend any other book on that subject. The present age, however, having, among other wonderful phenomena, witnessed a revival of the monster *Atheism*, we would advise our student to read with much attention Cudworth's Intellectual System, and to read it rather in Mosheim's Latin translation than in the author's original English. In the original, though many authors are quoted that are now but little known, there are very few references to the book, or chapter, or section, from which the quotations are taken. These omissions are supplied by the translator, who has likewise enriched his edition with many valuable and learned notes. It is well known that Cudworth wrote his incomparable work in confutation of Hobbes's philosophy; but instead of confining himself to the whimsies of his antagonist, which were in a little time to sink into oblivion, he took a much wider range, and traced atheism through all the mazes of antiquity, exposing the weakness of every argument by which such an absurdity had ever been maintained. In exhausting the metaphysical questions agitated among the Greeks concerning the being and perfections of God, he has not only given us a complete history of ancient learning, as far as it relates to these inquiries, but has in fact anticipated most of the sophisms of our modern atheists, who are by

3 G 2

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From this passage it is evident, that the Stagyrice, though he considered the motions of the heavenly bodies, the ebbing and flowing of the sea, and the other phenomena of nature, as affording a complete *proof* of the being and providence of God, did not however suppose that from these phenomena an untaught barbarian would *discover* this fundamental principle of religion. On the contrary, he expressly affirms, that before a man can feel the force of the evidence which they give of this important truth, he must have *heard* of the existence and power of God.

(B) It may not be improper to inform the reader, that Mr Wollaston, the author of the Religion of Nature, was a different man from Mr Woolston, who blasphemed the miracles of our Saviour. The former was a clergyman of great piety, and of such moderate ambition as to refuse one of the highest preferments in the church of England when it was offered to him; the latter was a layman remarkable for nothing but gloomy infidelity, and a perverse desire to deprive the wretched of every source of comfort. In the mind of the former, philosophy and devotion were happily united; in the mind of the latter, there was neither devotion nor science. Yet these writers have been frequently confounded; sometimes through inadvertence from the similarity of their names; and sometimes, we are afraid, designedly, from a weak and bigotted abhorrence of every system of religion that pretends to have its foundation in reason and in the nature of things.

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12
How the scriptures are to be studied.

no means such discoverers as they are supposed to be by their illiterate admirers.

The student having made himself master of natural theology, and carefully endeavoured to ascertain its limits, is now prepared to enter upon the important task of searching the scriptures. In doing this, he ought to divest himself as much as possible of the prejudices of education in behalf of a particular system of faith, and sit down to the study of the sacred volume as of a work to which he is an entire stranger. He ought first to read it as a moral history of facts and doctrines, beginning with the books of Moses, and proceeding through the rest, not in the order in which they are commonly published, but in that in which there is reason to believe they were written (see SCRIPTURES). If he be master of the Hebrew and Greek languages, he will doubtless prefer the original text to any version; and in this perusal we would advise him to consult no commentator, because his object at present is not to study the doctrines contained in the bible, but merely to discover what are the subjects of which it treats. Many histories of the bible have been written; and were we acquainted with a good one, we should recommend it as a clue to direct the young divine's progress through the various books which compose the sacred volume. Stackhouse's history has been much applauded by some, and as much censured by others. It is not a work of which we can express any high degree of approbation; but if read with attention, it may no doubt be useful as a guide to the series of facts recorded in the scriptures. Between the Old and New Testaments there is a great chasm in the history of the Jewish nation; but it is supplied in a very able and satisfactory manner by Dr Prideaux, whose *Old and New Testament connected* is one of the most valuable historical works in our own or any other language. Shuckford's *Sacred and Profane History of the World connected* is likewise a work of merit, and may be read with advantage as throwing light upon many passages of the Old Testament: but this author is not intitled to the same confidence with Prideaux, as his learning was not so great, and his partialities seem to have been greater.

In thus making himself master of the history of the Old and New Testaments, the student will unavoidably acquire some general notion of the various doctrines which they contain. These it will now be his business to study more particularly, to ascertain the precise meaning of each, and to distinguish such as relate to the whole human race, from those in which Abraham and his posterity were alone interested. He must therefore travel over the sacred volume a second time; and still we would advise him to travel without a guide. From Walton's *Polyglote bible*, and the large collection called *Critici sacri*, he may indeed derive much assistance in his endeavours to ascertain the sense of a difficult text; but we think he will do well to make little use of commentators and expositors, and still less of system-builders, till he has formed some opinions of his own respecting the leading doctrines of the Jewish and Christian religions.

"Impressed (says an able writer) with an awful sense of the importance of the sacred volume, the philosophical divine will shake off the bias of prejudices however formed, of opinions however sanctioned, and of passions however constitutional, and bring to the study of it the advantage of a pure and impartial mind. Instead of wasting all his labour upon a number of minute and less significant particulars, and of refining away plain and obvious sense by the

subtleties of a narrow and corrosive mind, his first object will be to institute a theological inquiry into the general design of the written word; and from principles fully contained and fairly understood, to illustrate the true nature and genius of the religious dispensation in all its parts. He will mark the difference between the first and second covenants, and observe the connection that subsists between them. He will trace the temporary economy of the *Old Testament*, and weigh the nature and intent of the *partial covenant* with the Jews; observing with astonishment how it was made introductory of better things to come: and he will follow it through the *law* and the *prophets* in its wonderful evolutions, till he see this vast and preparatory machine of providence crowned and completed in the eternal gospel. This *New Testament*, the last and best part of the religious dispensation, he will pursue through the sacred pages of that gospel with redoubled attention; contemplating the divine foundation on which it claims to be built, the supernatural means by which it was executed, and the immortal end which it has in view.*"

In the course of this inquiry into the import of the sacred volume, the student will pay particular attention to the circumstances of the age and country in which its various writers respectively lived, and to the nature of the different styles, *analogical* and *parabolical*, in which it is written. He will likewise keep in mind that God, whom it claims for its author, is the parent of truth, and that all his actions and dispensations must be consistent with one another. He will therefore compare the different passages of the Old and New Testaments which relate to the same doctrine, or to the same event, reasonably concluding that the bible must be the best interpreter of itself; and though the opinions which he thus forms may often be erroneous, they will seldom be dangerous errors, and may easily be corrected by mature reflection, or by consulting approved authors who have treated before him of the various points which have been the subject of his studies. Of this mode of proceeding one good consequence will be, that, having from the sacred scriptures formed a system of theology for himself, he will afterwards study the systems of other men without any violent prejudices for or against them; he will be so much attached to his own opinions as not to relinquish them in obedience to mere human authority, at the same time that he will be ready to give them up when convinced that they are not well founded; and if he have read the scriptures to any good purpose, he will have acquired such a love of truth as to embrace her wherever she may be found, whether among Papists or Protestants, in the school of Arminius or in that of Calvin.

As we have supposed that every man, after having formed a theological system of his own, will consult the systems of others, it may perhaps be expected that we should here recommend those which, in our opinion, are most worthy of his attention. To do this, however, would, we apprehend, be a very ungracious interference with the rights of private judgment. It would be to arrogate to ourselves a kind of authority to which, when assumed by others, we have cautioned our readers not to submit. But lest we should be suspected of wishing to bias the mind of the young student toward the short system which we are obliged to give, we shall just observe, that by the divines of what is called the *Arminian school*, Episcopius's *Theologia Institutiones* (c), Limborch's *Theologia Christiana*, and Locke's *Reasonableness*

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* Tatham's Chart and Scale of Truth.

13
Approved systems of divinity.

(c) There is, however, one chapter of this work which the majority of Arminians loudly condemn. Episcopius acknowledges

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sonableness of Christianity, have long been held in the highest esteem; whilst the followers of Calvin have preferred the *Institutiones* of their master, Turretine's *Institutio Theologiae Elencticae*, and Gill's *Body of Divinity*. This last work, which was published in two vols 4to in 1769, has many merits and many defects. Its style is coarse, impure, and tedious; and the author, who was a zealous antipædo-baptist, and seems to have possessed very little science, embraces every opportunity of introducing the discriminating tenets of his sect: but his book is fraught with profound learning, breathes the spirit of piety, and may be read with advantage by every divine who has previously formed the outlines of a system for himself.

14 Books recommended on the Mosaic dispensation.

As the Jewish and Christian dispensations are closely linked together, being in truth but parts of one great whole, it is impossible to have an adequate notion of the latter without understanding the design of the former. Now, though the Mosaic religion is nowhere to be learned but in the Old Testament, it may be convenient for our student, after he has formed his own opinions of it from that sacred source, to know what has been written on the subject by others. For illustrating the ritual law, a learned prelate warmly recommends the *Ductor Dubitantium* of Maimonides, and Spencer's book entitled *De Legibus Hebræorum Ritualibus*. Both works have undoubtedly great merit; but our young divine will do well to read along with them *Hermanni Wusii Ægyptiaca*, and Dr Woodward's Discourse on the Worship of the Ancient Egyptians, communicated to the London Society of Antiquaries in 1775, where some of Spencer's notions are shortly and ably refuted. On the other parts of this dispensation, such as the nature of its civil government; the rewards and punishments peculiar to it (D); its extraordinary administration by appointed agents, endowed with supernatural powers, and with the gifts of miracles and prophecy; the double sense in which the latter is sometimes involved; and the language consequent to its nature and use—the reader will find much erudition and ingenuity displayed in the second part of Warburton's *Divine Legation of Moses demonstrated*. His Lordship indeed is supposed by many, and perhaps justly, to have advanced, together with a great deal of good sense, many paradoxes in his favourite work; but still that work is entitled to a serious perusal, for it displays great learning and genius, and, we believe, the heaviest censures have fallen upon it from those by whom it was never read.

15 Inquiry to be made into the reality of revelation.

Having proceeded thus far in the course, the student's next business should be to inquire seriously what evidence there is that the doctrines which he has so carefully studied were indeed revealed in times past by God. He must already have perceived, in the nature and tendency of the doctrines themselves, strong marks of their origin being

more than human; but he must likewise have met with many difficulties, and he must prepare himself to repel the attacks of unbelievers. Here he will find opportunities of exerting the utmost powers of his reasoning faculties, and of employing in the service of religion all the stores he may have amassed of human learning. The scriptures pretend to have been written by several men who lived in different ages of the world; but the latest of them in an age very remote from the present. His first business therefore must be to prove the authenticity of these books, by tracing them up by historical evidence to the several writers whose names they bear. But it is not enough to prove them authentic. They profess to have been written by men divinely assisted and inspired, and of course infallible in what they wrote. He must therefore inquire into the truth of this inspiration. "The Bible contains a number of truths doctrinal and moral, which are called *mysteries*, and asserted to be the immediate dictates of God himself. To evince this great point to man, a number of supernatural *tests* and *evidences* are inseparably connected with those mysteries; so that if the former be true, the latter must likewise be so. He must therefore examine these tests and evidences, to establish the divinity of the Holy Scriptures;" and in this part of his course he will find much assistance from many writers whose defences of the truth and divinity of the Christian religion do honour to human nature.

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16

Books recommended on that subject.

The first step towards the embracing of any truth is, to get fairly rid of the objections which are made to it; and the general objections made by deistical writers to the Christian revelation are by no writer more completely removed than by Bishop Butler, in his celebrated work entitled *The Analogy of Religion natural and revealed to the Constitution and Course of Nature*. This book therefore the student should read with attention, and meditate upon with patience; but as it does not furnish a *positive proof* of the divinity of our religion, he should pass from it to *Grotius de Veritate Religionis Christianæ*, and *Stillingfleet's Origines Sacrae*. Both these works are excellent; and the latter, which may be considered as an improvement of the former, is perhaps the fullest and ablest defence of revelation in general that is to be found in any language. In this part of the united kingdom it is now indeed hardly mentioned, or mentioned with indifference; but half a century ago the English divines thought it a subject of triumph, and styled its author their *incomparable Stillingfleet*. Other works, however, may be read with great advantage, and none with greater than Paley's *Evidences of the Christian Religion*, and Leslie's *Short Method with the Deists*; which last work, in the compass of a very few pages, contains proofs of the divinity of the Jewish and Christian revelations, to which the celebrated Dr

Mid-

ledges (lib. iv. sect. 2. cap. 33.) that it may be proved from scripture, that the person who was afterwards Jesus Christ was from eternity the only begotten of his Father, by whom all things were made, and that therefore he is really and truly God. He mentions five senses in which our Saviour is called the son of God; and shews that in this fifth and last sense the filiation is peculiar to him alone. Yet in cap. 34. he states the following question: "An quintus iste modus filiationis Jesu Christi ad salutem scitu ac creditu necessarius sit, usque, qui illum negant, anathema dicendum sit?" and gravely answers it in the negative. It is not to be wondered at that most Arminians differ from this celebrated remonstrant in their answers to this question; for nothing can be more absurd than to hold religious communion with those who deny the divinity of that person, whose divinity, it is acknowledged, may be clearly proved. Against this extravagant position many Arminian pens were drawn; but none to better purpose than that of bishop Bull, whose *Judicium Ecclesiæ Catholicae trium primorum seculorum, &c. assertum contra M. Simonem Episcopum aliosque*, obtained for its author the thanks of the whole clergy of France assembled (1710) at St Germain en Laye in a national synod.

(D) On this subject the reader will find many excellent observations in Bishop Bull's *Harmonia Apostolica*, with its several defences, and in a small book of Dr Wells's, entitled *An Help for the right understanding of the several Divine Laws and Covenants*, whereby man has been obliged through the several ages of the world to guide himself in order to salvation.

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17 Jewish controversy to be studied,

† Warburton's Directions for the Study of Theology.

18 And the various controversies among Christians themselves.

19 Importance of ecclesiastical history, and books recommended.

Middleton confessed (E), that for 20 years he had laboured in vain to fabricate a specious answer (F).

Having satisfied himself of the truth of revelation in general, it may be worth the young divine's while to provide a defence of the Christian religion against the objections of modern Judaism. In this part of his studies he will need no other instruction than what he may reap from Limborch's work entitled *De Veritate Religionis Christianæ amica collatio cum erudito Judæo*. "In that disputation which was held with Orobio, he will find all that the stretch of human parts on the one hand, or science on the other, can produce to varnish error or unravel sophistry. All the papers of Orobio in defence of Judaism, as opposed to Christianity, are printed at large, with Limborch's answers, section by section; and the subtlest sophisms of a very superior genius are ably and satisfactorily detected and exposed by the strong, profound, and clear reasoning, of this renowned remonstrant †." See OROBIO and LIMBORCH.

The various controversies subsisting between the several denominations of Christians, about points which separate them into different churches, ought next to be studied in the order of the course; for nothing is unimportant which divides the followers of that Master whose favourite precept was *love*. It has indeed been long fashionable to decry polemical divinity as an useless, if not a pernicious, study; but it is not impossible that this fashion, like many others, has had its origin in ignorance, and that it tends to perpetuate those schisms which it professes to lament. We are, however, far, very far, from recommending to the young divine a perusal of the works of the several combatants on each side of a disputed question, till he has fitted himself for judging between them by a long course of preparatory study; and the only preparation which can fit him for this purpose is an impartial and comprehensive study of ecclesiastical history. He who has with accuracy traced the progress of our holy religion from the days of the apostles to the present time, and marked the introduction of new doctrines, and the rise of the various sects into which the Christian world is unhappily divided, is furnished with a criterion within himself by which to judge of the importance and truth of the many contested doctrines; whilst he who, without this preparation, shall read a multitude of books on any one religious controversy, will be in danger of becoming a convert to his last author, if that author possess any tolerable share of art and ingenuity. This we know was the case with Pope, who declares, that in studying the controversy between the churches of England and Rome, he found himself a Papist and Protestant by turns, according to the last book he read.

There are many histories of the Christian church which possess great merit, but we are acquainted with none which appears to us wholly impartial. Mosheim's is perhaps the

most perfect compend (G); and one of its greatest excellencies is, that on every subject the best writers are referred to for fuller information. These indeed should often be consulted, not only to supply the defects necessarily resulting from the narrowness of the limits which the author, with great propriety, prescribed to himself; but also to correct his partial obliquities; for with all his merits, and they were many and great, he is certainly not free from the influence of prejudice. Indeed there is no coming at the true history of the primitive church, but by studying the works of the primitive writers; and the principal works of the four first centuries will amply reward the labour of perusing them (H). The rise and progress of the reformation in general, the most important period of church-history, may be best learned from Sleidan's book *De Statu Religionis et Reipublicæ Caroli V. Cesare Commentarii*; the History of the Reformation of the Church of Scotland from Knox and Spotiswood; and that of the Church of England from the much applauded work of Bishop Burnet.

After this course of ecclesiastical history, the young divine may read with advantage the most important controversies which have agitated the Christian world; for he will now read them without danger of giving up his faith to the mere authority of great names. To enumerate these controversies, and to point out the ablest authors who have written on each, would be a very tedious, and perhaps not a very profitable, task. On one controversy, however, we are induced to recommend a very masterly work, because it is sufficient of itself to fix the principles of Protestants with respect to the church of Rome, and to put to shame the fashionable censurers of *polemical divinity*. The work to which we allude is Chillingworth's book against Knott, entitled *The Religion of Protestants a safe way to Salvation*; in which the school jargon of that subtle Jesuit is incomparably exposed, and the long dispute between the Popish and Reformed churches placed on its proper ground, the Holy Scriptures.

One of the strongest and most plausible objections to the study of polemical divinity, is its tendency to give a rigid turn to the sentiments of those long engaged in it; whilst we know, from higher authority than that of the ablest disputant, that "the end of the commandment is charity." But for preserving charity in the minds of Christians, there are better means than absolute ignorance or indifference to truth. Charity is violated only when a church unreasonably restrains the inquiries of its own members, or exercises intolerance towards those who have renounced its jurisdiction. The injustice of the first species of ecclesiastical tyranny is exposed in a very masterly manner by Jeremy Taylor in his *Liberty of Prophecy*, and by Stillingfleet in his *Irenicum*; the injustice of the second, by Locke in his celebrated Letters on Toleration. The man who shall peruse

20 Toleration.

(E) This piece of information we had from the late Dr Berkeley, prebendary of Canterbury, who had it from Archbishop Secker, to whom the confession was made.

(F) To these defences of revelation we might have added the collection of sermons preached at Boyle's lecture from 1691 to 1732, published in three volumes folio, 1739; the works of Leland; Bishop Newton's Dissertations on Prophecy; and above all, Lardner's Credibility of the Gospel History, with the Supplement to it. But there would be no end of recommending eminent writers on this subject. We have mentioned such as we most approve among those with whom we are best acquainted; but we must, once for all, caution the reader against supposing that we approve of every thing to be found in any work except the sacred scriptures.

(G) The Bishop of Landaff, in the catalogue of books published at the end of his Theological Tracts, recommends several other ecclesiastical histories as works of great merit; such as, Dupin's, Echard's, Gregory's, and Formey's, together with *Pauli Ernesti Jablonski Institutiones Historiæ Christianæ*, published at Frankfort in three volumes, 1754-67.

(H) For a proof of this position, and for a just estimate of the value of the *Fathers*, as they are called, see the introduction to Warburton's Julian, and Kett's Sermons at Bampton's Lectures.

Preliminary Directions. use these three works, and impartially weigh the force of their arguments, will be in no danger, unless his pride be very great, or his temper uncommonly irritable, of thinking uncharitably of those from whose principles the love of truth may compel him to dissent.

In these directions for the study of theology, we might have enumerated many more books on each branch of the subject well deserving of the most attentive perusal; but he who shall have gone through the course here recommended, will have laid a foundation on which, if he continue his diligence, he may raise such a superstructure as will entitle him to the character of an accomplished divine. His diligence must indeed be continued through life; for when a man ceases to make acquisitions in any department of learning, he soon begins to lose those which he has already made; and a more contemptible character is nowhere to be found than that of a clergyman unacquainted with the learning of his profession. This learning, however, is not to be acquired, and indeed is hardly to be preserved, by studying *bodies* or *institutes* of theology; and though we have mentioned a few generally approved by two rival sects of Christians, and must, in conformity with the plan of our work, give another ourselves, we do not hesitate to declare, that the man who has carefully gone through the course of study which we have recommended, though it be little more than the outlines on which he is to work, may, with no great loss to himself, neglect ours and all other systems. For as an excellent writer *, whom we have often quoted, well observes, "to judge of the *fact* whether such a revelation containing such a principle, with its mysteries and credentials, was actually sent from God and received by man, by examining the *evidences* and *circumstances* which accompanied it—the *time* when, the *place* where, the *manner* how, it was delivered—the *form* in which it descends to us—and in what it is *contained*—together with the particular *substance* and *burden* of it—and how every part is to be rightly understood: these are the various and extensive subjects which constitute the sublime office of THEOLOGIC REASONING and

the PROPER STUDY OF DIVINITY." On this account we shall pass over slightly, and sometimes perhaps without any notice, many things which every clergyman ought thoroughly to understand, and confine ourselves, in the short compend which we are to give, to the prime articles of Christian theology. In doing this, we shall endeavour as much as possible to divest ourselves of party prejudices; but as we are far from thinking that this endeavour will be completely successful (for we believe there is no man totally free from prejudice), we cannot conclude this part of the article more properly than with the following solemn CHARGE, with which a very learned divine † always prefaced his Theological Lectures.

Preliminary Directions.

I. "I do solemnly charge you, in the name of the God of Truth, and of our Lord Jesus Christ, who is the Way, the Truth, and the Life, and before whose judgment-seat you must in no long time appear, that in all your studies and inquiries of a religious nature, present or future, you do constantly, carefully, impartially, and conscientiously, attend to evidence, as it lies in the Holy Scriptures, or in the nature of things, and the dictates of reason; cautiously guarding against the fallies of imagination, and the fallacy of ill-grounded conjecture.

Dr Taylor of Norwich.

II. "That you admit, embrace, or assent, to no principle or sentiment by me taught or advanced, but only so far as it shall appear to you to be supported and justified by proper evidence from revelation or the reason of things.

III. "That if, at any time hereafter, any principle or sentiment by me taught or advanced, or by you admitted or embraced, shall, upon impartial and faithful examination, appear to you to be dubious or false, you either suspect or totally reject such principle or sentiment.

IV. "That you keep your mind always open to evidence: That you labour to banish from your breast all prejudice, prepossession, and party-zeal: That you study to live in peace and love with all your fellow Christians; and that you steadily assert for yourself, and freely allow to others, the unalienable rights of judgment and conscience."

²¹ A charge to students of theology.

PART I. OF NATURAL THEOLOGY.

SECT. I. Of the Being and Attributes of God.

*** St Pau.** HE who cometh to God, says an ancient divine *, deeply read in the philosophy of his age, must believe that he is, and that he is a rewarder of them who diligently seek him. This is a truth as undeniable as that a man cannot concern himself about a nonentity. The existence of God is indeed the foundation of all religion, and the first principle of the science which is the subject of this article. It is likewise a principle which must command the assent of every man who has any notion of the relation between effects and their causes, and whose curiosity has ever been excited by the phenomena of nature. This great and important truth we have elsewhere endeavoured to demonstrate (see METAPHYSICS, Part III. Chap. vi.); but it may be proved by arguments less abstracted from common apprehension than the nature of that article required us to use. Of these we shall give one or two, which we hope will be level to every ordinary capacity; whilst, at the same time, we earnestly recommend to the young divine a diligent study of those books on the subject which we have mentioned in the preceding directions.

23 We see that the human race, and every other species of animals, is at present propagated by the co-operation of two parents; but has this process continued from eternity? A

moment's reflection will convince us that it has not. Let us take any one man alive, and, to avoid perplexity, let us suppose his father and mother dead, and himself the only person at present existing: how came he into the world? It will be said he was produced mechanically or chemically by the conjunction of his parents, and that his parents were produced in the same manner by theirs. Let this then be supposed; it must surely be granted, that when this man was born, an addition was made to the series of the human race. But a series which can be enlarged may likewise be diminished; and by tracing it backwards, we must at some period, however remote, reach its beginning. There must therefore have been a first pair of the human race, who were not propagated by the conjunction of parents. How did these come into the world?

Anaximander tells us *, that the first men and all animals were bred in warm moisture, inclosed in crustaceous skins like crab-fish or lobsters; and that when they arrived at a proper age, their shelly prisons growing dry, broke, and made way for their liberty. Empedocles informs us, that mother Earth at first brought forth vast numbers of legs, and arms, and heads, &c. which, approaching each other, arranging themselves properly, and being cemented together, started up at once full grown men. Another of these philosophers relates, that there first grew up a sort of wombs, which

* See Bentley's Boyle's Lectures.

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§ Diodorus
Siculus apu-
luseb.
Prop. E-
wangel.

which having their roots in the earth, attracted thence a kind of milk for the nourishment of the foetus, which in process of time broke through the membranes and shifted for itself; whilst the Egyptian fathers of this hopeful school content themselves with simply affirming, that animals like vegetables sprung at first from the bosom of the earth.

Surely those sages, or their followers, should have been able to tell us why the earth has not in any climate this power of putting forth vegetable men or the parts of men at present. If this universal parent be eternal and self-existent, it must be incapable of decay or the smallest change in any of its qualities; if it be not eternal, we shall be obliged to find a cause for its existence, or at least for its form and all its powers. But such a cause may have produced the first human pair, and undoubtedly did produce them, without making them spring as plants from the soil. Indeed the growth of plants themselves clearly evinces a cause superior to any vegetative power which can be supposed inherent in the earth. No plant, from the sturdy oak to the creeping ivy, can be propagated but from seed, or slips from the parent stock; but when one contemplates the regular process of vegetation, the existence of every plant implies the prior existence of a parent seed, and the existence of every seed the prior existence of a parent plant. Which then of these, the oak or the acorn, was the first, and whence was its existence derived? Not from the earth; for we have the evidence of universal experience that the earth never produces a tree but from seed, nor seed but from a tree. There must therefore be some superior power which formed the first seed or the first tree, planted it in the earth, and gave to it those powers of vegetation by which the species has been propagated to this day.

24
And vege-
tables,

25
And from
the laws
of attrac-
tion and re-
pulsion, &c.

Thus clearly do the processes of generation and vegetation indicate a power superior to those which are usually called *the powers of nature*. The same thing appears no less evident from the laws of attraction and repulsion, which plainly prevail through the whole system of matter, and hold together the stupendous structure. Experiment shows that very few particles of the most solid body are in actual contact with each other (see OPTICS, n° 63—68, PHYSICS, n° 23.); and that there are considerable interstices between the particles of every elastic fluid, is obvious to the smallest reflection. Yet the particles of solid bodies strongly cohere, whilst those of elastic fluids repel each other. How are these phenomena accounted for? To say that the former is the effect of attraction and the latter of repulsion, is only to say that two individual phenomena are subject to those laws which prevail through the whole of the classes under which they are respectively arranged; whilst the question at issue is concerning the ORIGIN OF THE LAWS THEMSELVES, the *power* which makes the particles of gold cohere, and those of air repel each other. Power without substance is inconceivable; and by a law of human thought, no man can believe a being to operate but where it is in some manner or other actually present: but the particles of gold adhere, and the particles of air keep at a distance from each other, by powers exerted where no matter is present. There must therefore be some substance endowed with power which is not material.

Of this substance or being the power is evidently immense. The earth and other planets are carried round the sun with a velocity which human imagination can hardly conceive. That this motion is not produced by the agency of these vast bodies on one another, or by the interposition of any material fluid, has been shown elsewhere (see METAPHYSICS, n° 196—200. and OPTICS, n° 67.); and since it is a law of our best philosophy, *that we are not to multiply substances without necessity*, we must infer that the same Being

which formed the first animals and vegetables, endowing them with powers to propagate their respective kinds, is likewise the cause of all the phenomena of nature, such as *cohesion, repulsion, elasticity, and motion*, even the motions of the heavenly bodies themselves.

If this powerful Being, who is the parent of vegetable and animal life, and the source of all corporeal motions, be self-existent, intelligent, and independent in his actions and volitions, he is an original or first cause, and that Being whom we denominate God. If he be not self-existent and independent, there must be a cause in the order of nature prior and superior to Him, which is either itself the first cause, or a link in that series of causes and effects, which, however vast we suppose it, must be traced ultimately to some one Being, who is self-existent, and has in himself the power of beginning motion, independent of every thing but his own intelligence and volition. In vain have the Atheists alleged, that the series may ascend infinitely, and for that reason have no first mover or cause. An infinite series of successive beings involves an absurdity and contradiction (see METAPHYSICS, n° 288.): but not to insist upon this at present, we shall only beg leave to consider such a series as a whole, and see what consequences will flow from the supposition. That we may with logical propriety consider it in this light, is incontrovertible; for the birth of every individual of the human race shows that it is made up of parts: but parts imply a whole as necessarily as an attribute implies its substance. As in this supposed series there is no cause which is not likewise an effect, nor any body moving another which was not itself moved by a third, the whole is undeniably equivalent to an infinite effect, or an infinite body moved: but if a finite effect must necessarily have proceeded from a cause, and a finite body in motion must have been put into that state by a mover, is there a human mind which can conceive an infinite effect to have proceeded from *no* cause, or an infinite body in motion to have been moved by *nothing*? No, surely! An infinite effect, were such a thing possible, would compel us to admit an infinite cause, and an infinite body in motion a mover of infinite power.

This great cause is God, whose wisdom, power, and goodness, all nature loudly proclaims. That the phenomena which we daily see evince the existence of *one* such Being, has just been shown; and that we have no reason to infer the existence of *more* than one, a very few reflections will make abundantly evident. For, not to lay more stress than it will bear upon that rule of Newton's, which forbids us to multiply substances without necessity, such a harmony prevails through the whole visible universe, as plainly shows it to be under the government of one intelligence. That on this globe the several elements serve for nourishment to plants, plants to the inferior animals, and animals to man; that the other planets of our system are probably inhabited, and their inhabitants nourished in the same or a similar manner; that the sun is so placed as to give light and heat to all, and by the law of gravitation to bind the whole planets into one system with itself—are truths so obvious and so universally acknowledged, as to supersede the necessity of establishing them by proof. The fair inference therefore is, that the solar system and all its parts are under the government of *one intelligence*, which directs all its motions and all the changes which take place among its parts for some wise purposes. To suppose it under the government of two or more intelligences would be highly unreasonable; for if these intelligences had equal power, equal wisdom, and the same designs, one of them would evidently be superfluous; and if they had equal power and contrary designs, they could not be the parents of that harmony which we clearly perceive to prevail in the system.

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attributes
of God.

26
Absurdity
of an infi-
nite series
of effects.

27
There is
only one
original
cause.

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of God.

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of God.

But the Being capable of regulating the movements of so vast a machine, may well be supposed to possess infinite power, and to be capable of superintending the motions of the universe. That the widely extended system of nature is but one system, of which the several parts are united by many bonds of mutual connection, has been shown elsewhere (see *PHYSICS*), and appears daily more and more evident from our progress in physical discoveries; and therefore it is in the highest degree unreasonable to suppose that it has more than one author, or one supreme governor.

28
Of infinite
power,
wisdom,
and

As the unity of design apparent in the works of creation plainly prove the unity of their Author, so do the immensity of the whole, and the admirable adjustment of the several parts to one another, demonstrate His power and His wisdom. On this subject the following beautiful reflections by Mr Wollaston are deserving of the most serious attention.

|| Religion
of Nature,
sec. v.
prop. 14.

"In order (says that able writer ||) to prove to any one the grandness of this fabric of the world, one needs only to bid him consider the *sun*, with that insupportable glory and lustre that surrounds it; to demonstrate its vast distance, magnitude, and heat; to represent to him the chorus of planets moving periodically, by uniform laws, in their several orbits about it; guarded some of them by secondary planets, and as it were emulating the state of the sun, and probably all possessed by proper inhabitants; to remind him of those surprising visits which the *comets* make to us, and the large trains or uncommon splendor which attends them, the far country from which they come, and the curiosity and horror which they excite not only among us, but in the inhabitants of other planets, who may also be up to see the entry and progress of these ministers of fate: to direct his eye and contemplation through those azure fields and vast regions above him up to the *fixed stars*, that radiant numberless host of heaven; and to make him understand how unlikely a thing it is that they should be placed there only to adorn and bespangle a canopy over our heads; to convince him that they are rather so many *other suns*, with their several systems of planets about them; to show him by the help of glasses still more and more of these fixed lights, and to beget in him an apprehension of their inconceivable numbers, and those immense spaces that lie beyond our reach and even our imagination: One needs but to do this (continues our author), and explain to him such things as are now known almost to every body; and by it to show, that if the world be not infinite, it is *infinito similis*, and undoubtedly the work of an INFINITE ARCHITECT.

"But if we would take a view of all the *particulars* contained within that astonishing compass which we have thus hastily run over, how would wonders multiply upon us? Every corner, every part of the world, is as it were made up of *other worlds*. If we look upon this our earth, what scope does it furnish for admiration? The great variety of mountains, hills, valleys, plains, rivers, seas, trees, and plants! The many tribes of different animals with which it is stocked; the multifarious inventions and works of one of these, *i. e.* of us men; with the wonderful instincts of others, guiding them uniformly to what is best for themselves, in situations where neither sense nor reason could direct them. And yet when all these (heaven and earth) are surveyed as nicely as they can be by the help of our unassisted senses and of telescopes, we may discover by the assistance of good microscopes, in very small parts of matter, as many *new* wonders as those already discovered, new kingdoms of animals, with new and curious architecture. So that as our senses and even conception fainted before in the vast journeys we took in considering the expanse of the universe, they here again fail us in our researches into the principles and minute parts

of which it is composed. Both the *beginnings* and the *ends* of things, the *least* and the *greatest*, all conspire to baffle us; and which way soever we prosecute our inquiries, we still meet with fresh subjects of amazement, and fresh reasons to believe that there are indefinitely more and more behind, that will forever escape our eagerest pursuits and deepest penetration.

"In this vast assemblage, and amidst all the multifarious motions by which the several processes of generation and corruption, and the other phenomena of nature, are carried on, we cannot but observe that there are stated methods, as so many forms of proceeding, to which things punctually and religiously adhere. The same *causes* circumstanced in the same manner produce always the same *effects*; all the *species* of animals among us are made according to one general *idea*; and so are those of *plants* also, and even of *minerals*. No new species are brought forth or have arisen anywhere; and the old are preserved and continued by the *old ways*.

"It appears, lastly, beyond dispute, that in the parts and model of the world there is a contrivance for accomplishing certain ends. The sun is placed near the centre of our system, for the more convenient dispensing of his benign influences to the planets moving about him; the place of the earth's *equator* intersects that of her *orbit*, and makes a proper angle with it, in order to diversify the *year*, and create an useful variety of *seasons*; and many other things of this kind will be always observed, and though a thousand times repeated, be meditated upon with pleasure by good men and true philosophers. Who can observe the vapours to ascend, especially from the sea, meet above in clouds, and fall again after condensation, without being convinced that this is a kind of *distillation*, in order to clear the water of its grosser salts, and then by rains and dews to supply the fountains and rivers with fresh and wholesome liquor; to nourish the vegetables below by showers, which descend in drops as from a *watering-pot* upon a garden? Who can view the *structure* of a plant or animal, the indefinite number of its fibres and fine vessels, the formation of larger vessels, and the several members out of them, with the apt disposition of all these; the means contrived for the reception and distribution of *nutriment*; the *effect* this nutriment has in extending the vessels, bringing the vegetable or animal to its full growth and expansion, continuing the *motion* of the several fluids, repairing the decays of the body, and preserving *life*? Who can take notice of the several *faculties* of animals, their arts of saving and providing for themselves, or the ways in which they are provided for; the uses of plants to animals, and of some animals to others, particularly to mankind; the care taken that the several species should be propagated, without confusion, from their proper seeds; the strong inclination planted in animals for that purpose, their love of their young and the like. — Who (says our author) can observe all this, and not see a *design* in such *regular* pieces, so nicely wrought and so admirably preserved? If there were but one animal in existence, and it could not be doubted but that his eyes were formed that he might see with them, his ears that he might hear with them, and his feet to be instruments by which he might remove himself from place to place; if *design* and *contrivance* can be much less doubted, when the same things are repeated in the individuals of all the tribes of animals; if the like observations may be made with respect to vegetables and other things; and if all these *classes* of things, and much more the *individuals* comprehended under them, be inconceivably numerous, as most unquestionably they are — one cannot but be convinced, from what so plainly runs through the nobler parts of the visible world, that not only *they*, but other things, even those that seem to be *less noble*, have their ends likewise, though not always

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perceived by capacities limited like ours. And since we cannot, with the Epicureans of old, suppose the parts of matter to have contrived among themselves this wonderful form of a world, to have taken by agreement each its respective *post*, and then to have pursued in conjunction constant *ends* by certain methods and measures concerted, there must be some other Being, whose wisdom and power are equal to such a mighty work as is the *structure* and *preservation* of the world. There must be some Almighty MIND who modelled and preserves it; lays the causes of things so deep; prescribes them such uniform and steady laws; destines and adapts them to certain purposes; and makes one thing to fit and answer another so as to produce one harmonious whole. Yes,

These are thy glorious works, Parent of good!
Almighty, thine this universal frame,
Thus wondrous fair; THYSELF how wondrous then!

29

Goodness.

How wondrous in wisdom and in power!"

But the GOODNESS of God is not less conspicuous in his works than His power or His wisdom. Contrivance proves design, and the predominant tendency of the contrivances indicates the disposition of the designer. "The world (says an elegant and judicious writer†) abounds with contrivances, and all the contrivances in it with which we are acquainted are directed to beneficial purposes. Evil no doubt exists; but it is never that we can perceive the object of contrivance. Teeth are contrived to eat, not to ache; their aching now and then is incidental to the contrivance, perhaps inseparable from it; but it is not its object. This is a distinction which well deserves to be attended to. In describing implements of husbandry, one would hardly say of a sickle that it is made to cut the reaper's fingers, though from the construction of the instrument, and the manner of using it, this mischief often happens. But if he had occasion to describe instruments of torture or execution, this, he would say, is to extend the sinews; this to dislocate the joints; this to break the bones; this to scorch the soles of the feet. Here pain and misery are the very objects of the contrivance. Now nothing of this sort is to be found in the works of nature. We never discover a train of contrivance to bring about an evil purpose. No anatomist ever discovered a system of organization calculated to produce pain and disease; or, in explaining the parts of the human body, ever said, this is to irritate, this to inflame, this duct is to convey the gravel to the kidneys, this gland to secrete the humour which forms the gout. If by chance he come to a part of which he knows not the use, the most that he can say is, that to him it appears to be useless: no one ever suspects that it is put there to incommode, to annoy, or to torment. If God had wished our misery, he might have made sure of his purpose, by forming our senses to be as many sores and pains to us as they are now instruments of gratification and enjoyment; or, by placing us among objects so ill suited to our perceptions as to have continually offended us, instead of ministering to our refreshment and delight. He might have made, for instance, every thing we tasted bitter, every thing we saw loathsome, every thing we touched a sting, every smell a stench, and every sound a discord."

Instead of this, all our sensations, except such as are excited by what is dangerous to our health, are pleasures to us: The view of a landscape is pleasant; the taste of nourishing food is pleasant; sounds not too loud are agreeable, while musical sounds are exquisite; and hardly any smells, except such are excited by effluvia obviously pernicious to the brain, are disagreeable; whilst some of them, if not too long indulged, are delightful. Our lives are preserved and the species is continued by obeying the impulse of appetites;

of which the gratification is exquisite when not repeated too frequently, to answer the purposes of the Author of our being. Since, then, God has called forth his consummate wisdom to contrive and provide for our happiness, and has made those things which are necessary to our existence and the continuance of the race sources of our greatest sensual pleasures, who can doubt but that benevolence is one of his attributes; and that, if it were not impious to draw a comparison between them, it is the attribute in which he himself most delighteth?

But it is not from sensation only that we may infer the benevolence of the Deity: He has formed us with minds capable of intellectual improvement, and he has implanted in the breast of every man a very strong desire of adding to his knowledge. This addition to be sure cannot be made without labour; and at first the requisite labour is to most people irksome: but a very short progress in any study converts what was irksome into a pleasure of the most exalted kind; and he who by study, however intense, enlarges his ideas, and is conscious that he is daily rising in the scale of intelligence, experiences a complacency, which, though not so poignant perhaps as the pleasures of the sensualist, is such as endears him to himself, and is what he would not exchange for any thing else which this world has to bestow, except the still sweeter complacency arising from the consciousness of having discharged his duty.

That the practice of virtue is attended with a peculiar pleasure of the purest kind, is a fact which no man has ever questioned, though the immediate source of that pleasure has been the subject of many disputes. He who attributes it to a moral sense, which instinctively points out to every man his duty, and upon the performance of it rewards him with a sentiment of self-approbation, must of necessity acknowledge benevolence to be one of the attributes of that Being who has so constituted the human mind. That to protect the innocent, relieve the distressed, and do to others as we would in like circumstances wish to be done by, fills the breast, previous to all reflection, with a holy joy, as the commission of any crime tears it with remorse, cannot indeed be controverted. Many, however, contend, that this joy and this remorse spring not from any moral instinct implanted in the mind, but are the consequence of early and deep-rooted associations of the practice of virtue with the hope of future happiness, and of vice with the dread of future misery. On the respective merits of these two theories we shall not now decide. We have said enough on the subject in other articles (see INSTINCT, MORAL PHILOSOPHY, and PASSION); and shall here only observe, that they both lead with equal certainty to the benevolence of the Deity, who made us capable of forming associations, and subjected those associations to fixed laws. This being the case, the moral sense, with all its instantaneous effects, affords not a clearer or more convincing proof of his goodness, than that principle in our nature by which remote circumstances become so linked together, that, after the connecting ideas have escaped from the mind, the one circumstance never occurs without bringing the other also into view. It is thus that the pleasing complacency, which was perhaps first excited by the hopes of future happiness, comes in time to be so associated with the consciousness of virtuous conduct, the only thing entitled to reward, that a man never performs a meritorious action without experiencing the most exquisite joy diffused over his mind, though his attention at that instant may not be directed either to heaven or futurity. Were we obliged, before we could experience this joy, to estimate by reason the merit of every individual action, and trace its connection to heaven and future happiness through a long train of intermediate argu-

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mentation, we should be in a great measure deprived of the present reward of virtue; and therefore this associating principle contributes much to our happiness. But the benevolence of a Being, who seems as it were thus anxious to furnish us with both sensual and intellectual enjoyments, and who has made our duty our greatest pleasure, cannot be questioned; and therefore we must infer, that the Author of Nature wishes the happiness of the whole sensible and intelligent creation.

30
Objections,

To such reasoning as this in support of the Divine Benevolence many objections have been made. Some of them appear at first sight plausible, and are apt to stagger the faith of him who has bestowed no time on the study of that branch of general science which is called *physics* (see *PHYSICS*). To omit these altogether in such an article as this might be construed into neglect; whilst it is certain that there is in them nothing worthy of the attention of that man who is qualified either to estimate their force, or to understand the arguments by which they have often been repelled.

31
Answered.

It has been asked, Why, if the Author of Nature be a benevolent Being, are we necessarily subject to pain, diseases, and death? The scientific physiologist replies, Because from these evils Omnipotence itself could not in our present state exempt us, but by a constant series of miracles. He who admits miracles, knows likewise that mankind were originally in a state in which they were not subject to death; and that they fell under its dominion through the fault of their common progenitors. But the fall and restoration of man is the great subject of revealed religion; and at present we are discussing the question like philosophers who have no other data on which to proceed than the phenomena of nature. Now we know, that as all matter is divisible, every system composed of it must necessarily be liable to decay and dissolution; and our material system would decay and be dissolved long before it could serve the purposes of nature, were there not methods contrived with admirable wisdom for repairing the waste occasioned by perpetual friction. The body is furnished with different fluids, which continually circulate through it in proper channels, and leave in their way what is necessary to repair the solids. These again are supplied by food *ab extra*; and to the whole processes of digestion, circulation, and nutrition, the air we breathe is absolutely necessary. (See *PHYSIOLOGY*, Sect. 1, 2, 3, 4, 5). But as the air is a very heterogeneous fluid, and subject to violent and sudden changes, it is obvious that these changes must affect the blood, and by consequence the whole frame of the human body. We see the air indeed in process of time consume even marble itself; and therefore cannot wonder, that as it is in one state the parent of health, it should in another be the source of disease to such creatures as man and other terrestrial animals. Nor could these consequences be avoided without introducing others much more deplorable. The world is governed by general laws, without which there could be among men neither arts nor sciences; and tho' laws different from those by which the system is at present governed might perhaps have been established, there is not the smallest reason to imagine that they could on the whole have been better, or attended with fewer inconveniences. As long as we have material and solid bodies capable of motion, liable to resistance from other solid bodies, supported by food, subject to the agency of the air, and divisible, they must necessarily be liable to pain, disease, corruption, and death, and that too by the very influence of those laws which preserve the order and harmony of the universe. Thus gravitation is a general law so good and so necessary, that were it for a moment suspended, the world would instantly fall to pieces; and yet by means of this law the man

must inevitably be crushed to death upon whom a tower shall chance to tumble. Again, the attraction of cohesion is a general law, without which it does not appear that any corporeal system could possibly exist: it is by this law too, or a modification of it, that the glands and lacteals of the human body extract from the blood such particles as are necessary to nourish the solids; and yet it is by means of the very same modification of the very same law that a man is liable to be poisoned. How are these effects to be prevented?

Shall burning *Ætna*, if a sage requires,
Forget to thunder, and recal her fires?
On air or sea new motions be imprest,
Oh blameless Bethel! to relieve thy breast:
When the loose mountain trembles from on high
Shall gravitation cease if you go by?
Or some old temple nodding to its fall,
For Charters' head reserve the hanging wall?

Such a perpetual miracle, such a frequent suspending of the laws of nature in particular instances, we cannot doubt to be within the compass of Almighty power: but were this suspension really to take place, mankind would be involved in ignorance greater than that of childhood; for not one of them could know, or have any means of discovering this moment, what was to happen the next; and the consequence would be, that, uncertain but the single motion of a single joint might bring on them sudden destruction, they would all perish in a state of absolute inactivity.

But though the human body could not have been preserved from dangers and dissolution but by introducing evils, greater on the whole than those to which it is now liable, why, it has sometimes been asked, is every disorder to which it is subject attended with sickness or with pain? and why is such a horror of death implanted in our breasts, seeing that by the laws of nature death is inevitable? We answer, That sickness, pain, and the dread of death, serve the very best purposes. Could a man be put to death, or have his limbs broken without feeling pain, the human race had long ago been extinct. Felt we no uneasiness in a fever, we should be insensible of the disease, and die before we suspected our health to be impaired. The horror which generally accompanies our reflections on death tends to make us more careful of life, and prevents us from quitting this world rashly when our affairs prosper not according to our fond wishes. It is likewise an indication that our existence does not terminate in this world; for our dread is seldom excited by the prospect of the pain which we may suffer when dying, but by our anxiety concerning what we may be doomed to suffer or enjoy in the next stage of our existence; and this anxiety tends more perhaps than any thing else to make us live while we are here in such a manner as to ensure our happiness hereafter.

Thus from every view that we can take of the works and laws of God, and even from considering the objections which have sometimes been made to them, we are compelled to acknowledge the benevolence of their Author. We must not, however, suppose the Divine benevolence to be a fond and weak affection like that which is called benevolence among men. All human affections and passions originate in our dependence and wants; and it has been doubted whether any of them be at first disinterested (see *PASSION*): but he to whom existence is essential cannot be dependent; he who is the Author of every thing can feel no want. The divine benevolence therefore must be wholly disinterested, and of course free from those partialities originating in self-love, which are alloys in the most sublime of human virtues. The most benevolent man on earth, though he wishes the happiness of

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33
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justice.

every fellow-creature, has still, from the ties of blood, the endearments of friendship, or, perhaps from a regard to his own interest, some particular favourites whom, on a competition with others, he would certainly prefer. But the equal Lord of all can have no particular favourites. His benevolence is therefore coincident with justice; or, to speak more properly, that which is called *divine justice*, is only benevolence exerting itself in a particular manner for the propagation of general felicity. When God prescribes laws for regulating the conduct of his intelligent creatures, it is not because he can reap any benefit from their obedience to those laws, but because such obedience is necessary to their own happiness; and when he punishes the transgressor, it is not because in his nature there is any disposition to which the prospect of such punishment can afford gratification, but because in the government of free agents punishment is necessary to reform the criminal, and to intimidate others from committing the like crimes. But on this subject we need not dwell. It has been shewn elsewhere (*METAPHYSICS*, n° 312.), that all the moral attributes of God, his HOLINESS, JUSTICE, MERCY, and TRUTH, should be conceived as the same divine BENEVOLENCE, acting in different ways according to different exigencies, but always for the same sublime end—the propagation of the utmost possible happiness.

34
God in-
compre-
hensible,

The substance or essence of this self-existent, all-powerful, infinitely wise, and perfectly good Being, is to us wholly incomprehensible. That it is not matter, is shewn by the process of argumentation by which we have proved it to exist; but what it is we know not, and it would be impious presumption to inquire. It is sufficient for all the purposes of religion to know that God is some how or other present to every part of his works; that existence and every possible perfection is essential to him; and that he wishes the happiness of all his creatures. From these truths we might proceed to prove and illustrate the perpetual superintendence of his providence, both general and particular, over every the minutest part of the universe: but that subject has been discussed in a separate article; to which, therefore, we refer the reader. (See PROVIDENCE). We shall only observe at present, that the manner in which animals are propagated affords as complete a proof of the constant superintendence of divine power and wisdom, as it does of the immediate exertion of these faculties in the formation of the parent pair of each species. For were this business of propagation carried on by *necessary* and mechanical laws, it is obvious, that in every age there would be generated, in each species of animals, the very same proportion of males to females that there was in the age preceding. On the other hand, did generation depend upon *fortuitous* mechanism, it is not conceivable but that, since the beginning of the world, or, according to this hypothesis, during the course of eternity, several species of animals should in *some* age have generated nothing but *males*, and others nothing but *females*; and that of course many species would have been long since extinct. As neither of these cases has ever happened, the preservation of the various species of animals, by keeping up constantly in the world a due, though not always the same, proportion between the sexes of male and female, is a complete proof of the superintendence of divine providence, and of that saying of the apostle, that it is “in God we live, move, and have our being.”

35
But con-
stantly pre-
sent to his
works.

SECT. II. *Of the Duties and Sanctions of Natural Religion.*

FROM the short and very inadequate view that we have taken of the divine perfections, it is evidently our duty to

reverence in our minds the self-existent Being to whom they belong. This is indeed not only a duty, but a duty of which no man who contemplates these perfections, and believes them to be real, can possibly avoid the performance. He who thinks irreverently of the Author of nature, can never have considered seriously the power, the wisdom, and the goodness, displayed in his works; for whoever has a tolerable notion of these must be convinced, that he who performed them has no imperfection; that his power can accomplish every thing, which involves not a contradiction; that his knowledge is intuitive, and free from the possibility of error; and that his goodness extends to all without partiality and without any alloy of selfish design. This conviction must make every man on whose mind it is impressed ready to prostrate himself in the dust before the Author of his being; who, though infinitely exalted above him, is the source of all his enjoyments, constantly watches over him with paternal care, and protects him from numberless dangers. The sense of so many benefits must excite in his mind a sentiment of the liveliest gratitude to him from whom they are received, and an ardent wish for their continuance.

Whilst silent gratitude and devotion thus glow in the breast of the contemplative man, he will be careful not to form even a mental image of that all-perfect Being to whom they are directed. He knows that God is not material; that he exists in a manner altogether incomprehensible; that to frame an image of him would be to assign limits to what is infinite; and that to attempt to form a positive conception of him would be impiously to compare himself with his Maker.

The man who has any tolerable notion of the perfections of the Supreme Being will never speak lightly of him, or make use of his name at all but on great and solemn occasions. He knows that the terms of all languages are inadequate and improper, when applied directly to him who has no equal, and to whom nothing can be compared; and therefore he will employ these terms with caution. When he speaks of his mercy and compassion, he will not consider them as feelings wringing the heart like the mercy and compassion experienced by man, but as rays of pure and disinterested benevolence. When he thinks of the stupendous system of nature, and hears it, perhaps, said that God formed it for his own glory, he will reflect that God is so infinitely exalted above all his creatures, and so perfect in himself, that he can neither take pleasure in their applause, as great men do in the applauses of their fellow-creatures, nor receive any accession of any kind from the existence of ten thousand worlds. The immense fabric of nature therefore only displays the glory or perfections of its Author to *us* and to other creatures who have not faculties to comprehend him in himself.

When the contemplative man talks of *serving* God, he does not dream that his services can increase the divine felicity; but means only that it is his duty to obey the divine laws. Even the pronoun *He*, when it refers to God, cannot be of the same import as when it refers to man; and by the philosophical divine it will seldom be used but with a mental allusion to this obvious distinction.

As the man who duly venerates the Author of his being will not speak of him on trivial occasions, so will he be still further from calling upon him to witness impertinences and falsehood, (see OATH). He will never mention his name but with a *pause*, that he may have time to reflect in silence on his numberless perfections, and on the immense distance between himself and the Being of whom he is speaking. The slightest reflection will convince him that the world with all that it contains depends every moment upon

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sanctions
of natural
religion.

36
Reverence
and grati-
tude due
to God.

37
Of whom
no positive
idea should
be formed.

38
How he
ought to
be spoken
of; and

39
What is
meant by
serving
him.

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functions
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religion.

upon that God who formed it; and this conviction will compel him to wish for the divine protection of himself and his friends from all dangers and misfortunes. Such a wish is in effect a prayer, and will always be accompanied with adoration, confession, and thanksgiving (see PRAYER). But adoration, confessions, application, and thanksgiving, constitute what is called *worship*, and therefore the worship of God is a natural duty. It is the addressing of ourselves as his dependants to him as the supreme cause and governor of the world, with acknowledgments of what we enjoy, and petitions for what we really want, or he knows to be convenient for us. As if, *ex. gr.* I should in some humble and composed manner (says Mr Wallaston) pray to that "Almighty Being, upon whom depends the existence of the world, and by whose providence I have been preserved to this moment, and enjoyed many undeserved advantages, that he would graciously accept my grateful sense and acknowledgments of all his beneficence towards me; that he would deliver me from the evil consequences of all my transgressions and follies; that he would endue me with such dispositions and powers as may carry me innocently and safely through all future trials, and may enable me on all occasions to behave myself conformably to the laws of reason piously and wisely; that He would suffer no being to injure me, no misfortunes to befall me, nor me to hurt myself by any error or misconduct of my own; that he would vouchsafe me clear and distinct perceptions of things; with so much health and prosperity as may be good for me; that I may at least pass my time in peace, with contentment and tranquillity of mind; and that having faithfully discharged my duty to my family and friends, and endeavoured to improve myself in virtuous habits and useful knowledge, I may at last make a decent and happy exit, and find myself in some better state."

40
Divine
worship a
natural du-
ty.

That an untaught savage would be prompted by *instinct* to address the Supreme Being in such terms as this, we are so far from thinking, that to us it appears not probable that such a savage, in a state of solitude, would be led by instinct to suppose the existence of that Being. But as soon as the being and attributes of God were, by whatever means, made known unto man, every sentiment expressed in this prayer must necessarily have been generated in his mind; for not to be sensible that we derive our existence and all our enjoyments from God, is in effect to deny his being or his providence; and not to feel a wish that he would give us what we want, is to deny either his goodness or his power.

41
Whether
or not is
public wor-
ship a du-
ty of na-
tural reli-
gion?

The worship of God therefore is a natural duty resulting from the contemplation of his attributes and a sense of our own dependence. But the reasoning which has led us to this conclusion respects only *private* devotion; for it is a question of much greater difficulty, and far enough from being yet determined, whether *public* worship be a duty of that religion which can with any propriety be termed *natural*. Mr Wallaston indeed positively affirms that it is, and endeavours to prove his position by the following arguments.

42
Arguments
for it,

"A man (says he) may be considered as a member of some society; and as *such* he ought to worship God if he has the opportunity of doing it, if there be proper prayers used publicly which he may resort to; and if his health, &c. permit. Or the society may be considered as *one body*, that has common interests and concerns, and as *such* is obliged to worship the Deity, and offer one prayer. Besides, there are many who know not of themselves how to pray; perhaps cannot so much as read. These must be taken *as they are*; and consequently some time and place *appointed* where they may

have suitable prayers read to them, and be guided in their devotions. And further, towards the keeping mankind in order, it is *necessary* there should be some religion professed, and even established, which cannot be without public worship. And were it not for that sense of virtue which is *principally* preserved (so far as it is preserved) by national *forms* and *habits* of religion, men would soon lose it *all*, run wild, prey upon one another, and do what else the worst of savages do."

These are in themselves just observations, and would come with great force and propriety from the tongue or pen of a Christian preacher, who is taught by revelation that the Master whom he serves has commanded his followers "not to forsake the assembling of themselves together," and has promised, "that if two of them shall agree on earth as touching any thing that they shall ask, it shall be done for them of his Father who is in heaven." As urged by such a man and on such grounds, they would serve to show the fitness of the divine command, and to point out the benefits which a religious obedience to it might give us reason to expect. But the author is here professing to treat of *natural* religion, and to state the duties which result from the mere relation which subsists between man as a creature and God as his creator and constant preserver. Now, though we readily admit the benefits of public worship as experienced under the Christian dispensation, we do not perceive any thing in this reasoning which could lead a pious theist to expect the same benefit previous to all experience. When the author thought of *national forms* and *establishments of religion*, he certainly lost sight of his proper subject, and, as such writers are too apt to do, comprehended under the religion of nature what belongs only to that which is revealed. Natural religion, in the proper sense of the words, admits of no particular *forms*, and of no *legal establishment*. Private devotion is obviously one of its duties, because sentiments of adoration, confession, supplication, and thanksgiving, necessarily spring up in the breast of every man who has just notions of God and of himself: but it is not so obvious that such notions would induce any body of men to meet at *stated times* for the purpose of expressing their devotional sentiments in public. Mankind are indeed social beings, and naturally communicate their sentiments to each other; but we cannot conceive what should at first have led them to think that public worship at *stated times* would be acceptable to the self-existent Author of the universe. In case of a famine, or any other calamity in which the whole tribe was equally involved, they might speak of it to each other, inquire into its cause, and in the extremity of their distress join perhaps in one fervent petition, that God would remove it. In the same manner they might be prompted to pour forth occasional ejaculations of public gratitude for public mercies; but it does not follow from these incidental occurrences that they would be led to institute times and places and forms of national worship, as if they believed the omniscient Deity more ready to hear them in public than in private. That the appointment of such times and forms and places is beneficial to society, experience teaches us; and therefore it is the duty, and has been the practice, of the supreme magistrate in every age and in every civilized country to provide for the maintenance of the national worship. But this practice has taken its rise, not from the deductions of reason, but either from direct revelation, as among the Jews and Christians; or from tradition, which had its origin in some early revelation, as among the more enlightened Pagans of ancient and modern times.

We hope that none of our readers will be so unjust as to suppose that by this disquisition we mean, in any degree, to call

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functions
of natural
religion.

43
Borrowed
from reve-
lation.

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sanctions
of natural
religion.

44
Its great
usefulness.

45
The prac-
tice of
virtue a
duty of na-
tural reli-
gion.

46
Cruelty to
the inferior
animals a
sin.

call in question the fitness or the duty of public worship. This is so far from our intention, that we firmly believe with Mr Wollaston, that what piety remains among us is to be attributed in a great measure to the practice of frequenting the church on Sundays; and that it is the neglect of this particular duty which has rendered the present generation of men less pious, less humble, and more prone to faction, than their fathers were, who made it a point every Lord's day to unite with some congregation of Christians in the public worship of their Creator and Redeemer. But whilst we are convinced of the importance and necessity of this too much neglected duty, and could wish to impress our conviction upon the minds of all our readers, we do not apprehend that we lessen its dignity, or detract from the weight of almost universal practice, by endeavouring to derive that practice from its true source, which appears to us to be not human reason, but divine revelation.

But whatever doubts may be entertained with respect to the origin of public worship, there can be none as to the foundation of moral virtue. Reason clearly perceives it to be the will of our Maker, that every individual of the human race should treat every other individual as, in similar circumstances, he could justly expect to be treated himself. It is thus only that the greatest sum of human happiness can be produced (see MORAL PHILOSOPHY, n° 17. and 135.); for were all men temperate, sober, just in their dealings, faithful to their promises, and charitable to the poor, &c. it is obvious that no miseries would be felt upon earth, but the few which, by the laws of corporeal nature, unavoidably result from the union of our minds with systems of matter. But it has been already shown, that the design of God in forming sentient beings was to communicate to them some portion, or rather some resemblance, of that felicity which is essential to himself; and therefore every action which in its natural tendency co-operates with this design must be agreeable to him, as every action of a contrary tendency must be disagreeable.

From this reasoning it follows undeniably, that we are obliged not only to be just and beneficent to one another, but also to abstain from all unnecessary cruelty to inferior animals. That we have a right to tame cattle, and employ them for the purposes of agriculture and other arts where strength is required, is a position which we believe has never been controverted. But if it is the intention of God to communicate, in different degrees according to their different ranks, a portion of happiness to all his creatures endowed with sense, it is obvious that we sin against him when we subject even the horse or the ass to greater labour than he is able to perform; and this sin is aggravated when from avarice we give not the animal a sufficient quantity of food to support him under the exertions which we compel him to make. That it is our duty to defend ourselves and our property from the ravages of beasts of prey, and that we may even exterminate such beasts from the country in which we live, are truths which cannot be questioned; but it has been the opinion of men, eminent for wisdom and learning, that we have no right to kill an ox or a sheep for food, but in consequence of the divine permission to Noah recorded in the ninth chapter of the book of Genesis. Whether this opinion be well or ill founded we shall not positively determine, though the arguments upon which it is made to rest are of such a nature as the fashionable reasoners of the present day would perhaps find it no easy task to answer; but it cannot admit of a doubt, that, in killing such animals, we are, in duty to their Creator and ours, bound to put them to the least possible pain. If this be granted, and we do not see how it can be denied by any man convinced of

the benevolence of the Deity, it is still more evident that we act contrary to the divine will when, for our mere amusement, we torture and put to death such animals as are confessedly not injurious to ourselves, or to any thing upon which the comforts of life are known to depend. We are indeed far from being convinced with the poet, that insects and reptiles "in mortal sufferance feel as when a giant dies," (see PLEASURE and PHYSIOLOGY, Sect. viii.); but their feelings on that occasion are certainly such, as that, when we wantonly inflict them, we thwart, as far as in our power, the benevolent purpose of the Creator in giving them life and sense. Let it be observed too, that the man who practises needless cruelty to the brute creation is training up his mind for exercising cruelty towards his fellow-creatures, to his slaves if he have any, and to his servants; and by a very quick progress to all who may be placed beneath him in the scale of society.

Such are the plain duties of natural religion; and if they were universally practised, it is self-evident that they would be productive of the greatest happiness which mankind could enjoy in this world, and that piety and virtue would be their own reward. They are however far from being universally practised; and the consequence is, that men are frequently raised to affluence and power by vice, and sometimes sunk into poverty by a rigid adherence to the rules of virtue.

This being the case, there can be no question of greater importance, while there are few more difficult to be answered, than "What are the sanctions by which natural religion enforces obedience to her own laws?" It is not to be supposed that the great body of mankind should, without the prospect of an ample reward, practise virtue in those instances in which such practice would be obviously attended with injury to themselves; nor does it appear reasonable in any man to forego present enjoyment, without the well-grounded hope of thereby securing to himself a greater or more permanent enjoyment in reversion. Natural religion therefore, as a system of doctrines influencing the conduct, is exceedingly defective, unless it affords sufficient evidence, intelligible to every ordinary capacity, of the immortality of the soul, or at least of a future state of rewards and punishments. That it does afford this evidence, is strenuously maintained by some deists, and by many philosophers of a different description, who, though they profess Christianity, seem to have some unaccountable dread of being deceived by their bibles in every doctrine which cannot be propped by the additional buttress of philosophical reasoning.

One great argument made use of to prove that the immortality of the soul is among the doctrines of natural religion, is the universal belief of all ages and nations that men continue to live in some other state after death has separated their souls from their bodies. "*Quod si omnium consensus naturæ vox est: omnesque, qui ubique sunt, consentiunt esse aliquid, quod ad eos pertineat, qui vita cesserint: nobis quoque idem existimandum est: et si, quorum aut ingenio, aut virtute animus excellit, eos arbitramur, quia natura optima sunt, cernere naturæ vim maxime: verisimile est, cum optimus quisque maxime posteritati serviat, esse aliquid, cujus is post mortem sensum sit, habiturus. Sed ut deos esse natura opinamur, qualesque sint, ratione cognoscimus, sic permanere animos arbitramur consensu nationum omnium.*"

That this is a good argument for the truth of the doctrine, through whatever channel men may have received it, we readily acknowledge; but it appears not to us to be any proof of that doctrine's being the deduction of human reasoning. The popular belief of Paganism, both ancient and modern, is so fantastic and absurd, that it could never have been

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sanctions
of natural
religion.

47
Natural
religion de-
fective in
its evidence
of a future
state.

48
The gene-
ral expecta-
tion of a
future
state.

* Cicero.
Tusc. Quest.
lib. i. § 15,
16.

49
Not the
offspring of
nature.

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of natural
religion.

been rationally inferred from what nature teaches of God and the soul. In the Elysium of the Greek and Roman poets, departed spirits were visible to mortal eyes; and must therefore have been clothed with some material vehicle of sufficient density to reflect the rays of light, though not to resist the human touch. In the mythology of the northern nations, as deceased heroes are represented as eating and drinking, they could not be considered as entirely divested of matter; and in every popular creed of idolatry, future rewards were supposed to be conferred, not for private virtue, but for public violence, upon heroes and conquerors and the destroyers of nations. Surely no admirer of what is now called natural religion will pretend that these are part of its doctrines; they are evidently the remains of some primeval tradition obscured and corrupted in its long progress through ages and nations.

50
Opinions
of the phi-
losophers
respecting
a future
state.

The philosophers of Greece and Rome, despising the popular mythology of their respective countries, employed much time and great talents in disquisitions concerning the human soul and the probability of a future state; and if the genuine conclusions of natural religion on this subject are anywhere to be found, one would naturally look for them in the writings of those men whose genius and virtues did honour to human nature. Yet it is a fact which cannot be controverted, that the philosophers held such notions concerning the substance of the soul and its state after death as could afford no rational support to suffering virtue, (see METAPHYSICS, Part III. chap. 4). Socrates is indeed an exception. Confining himself to the study of ethics, and despising those metaphysical subtleties with which so many others had bewildered themselves, that excellent person inferred by the common moral arguments (see MORAL PHILOSOPHY, n^o 232—246), that the reality of a future state of rewards and punishments is in the highest degree probable. He was not, however, at all times absolutely convinced of this important truth; for a little before his death he said to some who were about him, "I am now about to leave this world, and ye are still to continue in it; which of us have the better part allotted us, God only knows*." And again, at the end of his most admired discourse concerning the immortality of the soul, delivered at a time when he must have been serious, he said to his friends who came to pay their last visit, "I would have you to know that I have great hopes that I am now going into the company of good men; yet I would not be too peremptory and confident concerning it §."

* Plato in
Apolog. Soc.

§ Plato in
Phaed.

§ Tuse.
Quest.
lib. i. § 9,
20, 21.

Next to Socrates, Cicero was perhaps the most respectable of all the philosophers of antiquity; and he seems to have studied this great question with uncommon care: yet what were his conclusions? After retailing the opinions of various sages of Greece, and showing that some held the soul to be the heart; others, the blood in the heart; some, the brain; others, the breath; one, that it was harmony; another, that it was number; one, that it was nothing at all; and another, that it was a certain quintessence without a name, but which might properly be called *εὐχρηστος*—he gravely adds, "Harum sententiarum quæ vera sit, Deus aliquis viderit: quæ verisimilima, magna questio est §." He then proceeds to give his own opinion; which, as we have shown elsewhere, was, that the soul is part of God.

To us who know by other evidence that the soul is immortal, and that there will be a future state in which all the obliquities of the present shall be made straight, the argument drawn from the moral attributes of God, and the unequal distribution of the good things of this life, appears to have the force of demonstration. Yet none of us will surely pretend to say that his powers of reasoning are greater

than were those of Socrates and Cicero: and therefore the probability is, that had we been like them destitute of the light of revelation, we should have been disturbed by the same doubts, and have said with the latter, upon reading the arguments of the former as detailed by Plato, "Nescio quomodo, dum lego, assentior: cum posui librum, et mecum ipse de immortalitate animorum cœpi cogitare, assensio illa elabitur †."

No one, we hope, will suspect us of an impious attempt to weaken the evidence of a future state, God forbid! The expectation of that state is the only support of virtue and religion; and we think the arguments which we have stated elsewhere, and referred to on the present occasion, make the reality of it so highly probable, that, though there were no other evidence, he would act a very foolish part who should confine his attention wholly to the present life. But we do not apprehend that we can injure the cause either of virtue or of religion, by confessing, that those arguments which left doubts in the minds of Socrates and Cicero appear not to us to have the force of complete demonstration of that life and immortality which our Saviour brought to light through the gospel.

Were the case, however, otherwise; were the arguments which the light of nature affords for the immortality of the human soul as absolutely convincing as any geometrical demonstration—natural religion would still be defective; because it points out no method by which such as have offended God may be certainly restored to his favour, and to the hopes of happiness which by their sin they had lost. The he who knows whereof we are made would show himself placable to sinners, and that he would find some way to be reconciled, might perhaps be reasonably inferred from the consideration of his benevolence displayed in his works. But when we come to inquire more particularly how we are to be reconciled, and whether a propitiation will be required, nature stops short, and expects with impatience the aid of some particular revelation. That God will receive returning sinners, and accept of repentance instead of perfect obedience, cannot be certainly known by those to whom he has not declared that he will. For though repentance be the most probable, and indeed the only means of reconciliation which nature suggests; yet whether he, who is of purer eyes than to behold iniquity, will not require something further before he restore sinners to the privileges which they have forfeited, mere human reason has no way of discovering. From nature therefore arises no sufficient comfort to sinners, but anxious and endless solicitude about the means of appeasing the Deity. Hence those divers ways of sacrificing, and those numberless superstitions which overspread the heathen world, but which were so little satisfactory to the wiser part of mankind, that, even in those days of darkness, the philosophers frequently declared that, in their opinion, those rites and oblations could avail nothing towards appeasing the wrath of an offended God, or making their prayers acceptable to him. Hence Socrates and one of his disciples are represented by Plato † as expecting a person divinely commissioned to inform them whether sacrifices be acceptable to the Deity, and as resolving to offer no more till that person's arrival, which they piously hoped might be at no great distance.

This darkness of the pagan world, which the best of men who lived under it so pathetically deplored, is to us who live under the sunshine of the gospel happily removed by the various revelations contained in the scriptures of the Old and New Testaments. These taken together, and in the order in which they were given, exhibit such a display of providence, such a system of doctrines, and such precepts of practical

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functions
of natural
religion.

51
Without
the light
of revela-
tion we
should
have
doubted
like them.

Ibid.

52
Natural re-
ligion has
no means
of certain-
ly recon-
ciling the
Deity to
sinners.

† In Alcibi-
ades.

53
These
doubts re-
moved by
the Scrip-
tures.

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religion.

practical wisdom, as the ingenuity of man could never have discovered. The Christian, with the scriptures in his hands, can regulate his conduct by an infallible guide, and rest his

hopes on the surest foundation. These scriptures it is now our business to examine.

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of natural
religion.

PART II. OF REVEALED THEOLOGY.

54
Many pre-
tences to
revelation,

IN every civilized country the popular system of theology has claimed its origin from divine revelation. The Pagans of antiquity had their augurs and oracles; the Chinese have their inspired teachers Confucius and Fohi; the Hindoos have their sacred books derived from Brahma; the followers of Mahomet have their koran dictated by an angel; and the Jews and Christians have the scriptures of the Old and New Testaments, which they believe to have been written by holy men of old, who spake and wrote as they were moved by the Holy Ghost.

That the claims of ancient Paganism to a theology derived from heaven, as well as the similar claims of the Chinese, Hindoos, and Mahometans, are ill founded, has been shown in various articles of this work, (see CHINA, HINDOSTAN, MAHOMETANISM, MYTHOLOGY, and POLYTHEISM); whilst, under the words RELIGION, REVELATION, and SCRIPTURE, we have sufficiently proved the divine inspiration of the Jewish and Christian scriptures, and of course the divine origin of Jewish and Christian theology. These indeed are not two systems of theology, but parts of one system which was gradually revealed as men were able to receive it; and therefore both scriptures must be studied by the Christian divine.

There is nothing in the sacred volume which it is not of importance that he should understand whose office it is to be a teacher of religion; for the whole proceeds from the fountain of truth: but some of its doctrines are much more important than others, as relating immediately to man's everlasting happiness; and these it has been customary to arrange and digest into regular systems, called *bodies* or *institutes* of *Christian theology*. Could these artificial systems be formed with perfect impartiality, they would undoubtedly be useful, for the bible contains many historical details, but remotely related to human salvation; and even of its most important truths, it requires more time and attention than the majority of Christians have to bestow, to discover the mutual connection and dependence.

36
Common
divisions of
revealed
theology,

Artificial systems of theology are commonly divided into two great parts, the *theoretic* and the *practical*; and these again are subdivided into many inferior branches. Under the theoretic part are sometimes classed,

1. *Dogmatic* theology; which comprehends an entire system of all the dogmas or tenets which a Christian is bound to believe and profess. The truth of these the divine must clearly perceive, and be able to enforce upon his audience: and hence the necessity of studying what is called,
2. The *exegesis*, or the art of attaining the true sense of the holy scriptures; and,
3. *Hermeneutic* theology, or the art of interpreting and explaining the scriptures to others; an art of which no man can be ignorant who knows how to attain the true sense of them himself.
4. *Polemical* theology, or controversy; and,
5. *Moral* theology, which is distinguished from moral philosophy, or the simple doctrine of ethics, by teaching a much higher degree of moral perfection than the mere light of reason could ever have discovered, and adding new motives to the practice of virtue.

The practical sciences of the divine are,

1. *Homiletic*, or *pastoral* theology; which teaches him to adapt his discourses from the pulpit to the capacity of his

hearers, and to pursue the best methods of guiding them by his doctrine and example in the way of salvation.

2. *Catechetical* theology, or the art of teaching youth and ignorant persons the principal points of evangelical doctrine, as well with regard to belief as to practice.

3. *Casualistic* theology, or the science which decides on doubtful cases of moral theology, and that calms the scruples of conscience which arise in the Christian's soul during his journey through the present world.

We have mentioned these divisions and subdivisions of the science of theology, not because we think them important, but merely that our readers may be at no loss to understand the terms when they meet with them in other works. Of such terms we shall ourselves make no use, for the greater part of them indicate distinctions where there is no difference, and tend only to perplex the student. As the truths of Christianity are all contained in the scriptures of the Old and New Testaments, it is obvious that dogmatic theology must comprehend the speculative part of that which is called moral, as well as every doctrine about which controversy can be of importance. But no man can extract a single dogma from the bible but by the practice of what is here called the *exegesis*; so that all the subdivisions of this arrangement of theoretical theology must be studied together as they necessarily coalesce into one. The same thing is true of the three branches into which practical theology is here divided. He who has acquired the art of adapting his homilies to the various capacities of a mixed audience, will need no new study to fit him for instructing children, and the most ignorant persons who are capable of instruction; and the complete master of moral theology will find it no very difficult task to resolve all the cases of conscience which he can have reason to suppose will ever be submitted to his judgment. For these reasons we shall not, in the short summary which our limits permit us to give, trouble either ourselves or our readers with the various divisions and subdivisions of theology. Our preliminary directions will show them how we think the science should be studied; and all that we have to do as *system-builders*, a title of which we are far from being ambitious, is to lay before them the view which the scriptures present to us of the being and perfections of God, his various dispensations to man, and the duties thence incumbent upon Christians. In doing this, we shall follow the order of the divine dispensations as we find them recorded in the Old and New Testaments, dwelling longest upon those which appear to us of most general importance. But as we take it for granted that every reader of this article will have previously read the whole sacred volume, we shall not scruple to illustrate dogmas contained in the Old Testament by texts taken from the New, or to confirm doctrines peculiar to the Christian religion by the testimony of Jewish prophets.

SECT. I. Of God and his Attributes.

IN every system of theology the first truths to be believed are those which relate to the being and attributes of God. The Jewish lawgiver, therefore, who records the earliest revelations that were made to man, begins his history with a display of the power and wisdom of God in the creation of the world. He does not inform his countrymen,

57
Useless.

58

The first
revelation
supposes
the Being
of God to
be a known
truth.

God and
his attri-
butes.

men, and expect them to believe, upon the authority of his divine commission, that God *exists*; for he well knew that the being of God must be admitted, and tolerably just notions entertained of his attributes, before man can be required to pay any regard to miracles which afford the only evidence of a primary revelation. "In the beginning (says he) God created the heavens and the earth." Here the being of God is assumed as a truth universally received; but the sentence, short as it is, reveals another which, as we shall afterwards shew, human reason could never have discovered.

59
Extraordi-
nary deno-
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preme Be-
ing in the
book of
Genesis

It will however be proper, before we consider the creation of the world, and compare what the scriptures say of it with the opinions of the most enlightened ancients on the same subject, to attend to the appellation which is here given to God; and inquire what light is thrown upon it by subsequent revelations. The passage in the original is בראשית ברא אלהים, where it is remarkable that the Creator is denominated by a noun in the plural number, signifying literally "persons under the obligation of an oath to perform certain conditions." This is certainly a very extraordinary denomination for the one supreme and self-existent Being; and what adds to the strangeness of the phraseology is, that the verb with which this plural noun is made to agree is put in the singular number. What now could be the sacred historian's motive for expressing himself in this manner? His style is in general remarkable for its plainness and grammatical accuracy; and we believe it would be difficult to find in all his five books a single phrase not relating to the Supreme Being in which there appears such a violation of concord.

In answer to this question, it has been said, that Moses uses the plural noun to express in a magnificent way the majesty of God, just as it is customary for kings and earthly potentates, when publishing edicts and laws, to call themselves *we* and *us*. But there is no evidence on record that such a mode of speaking was introduced among kings at a period so early as the era of Moses. Pharaoh was probably as mighty a potentate as any who then reigned upon the earth; but though he is often mentioned by the same sacred historian as issuing edicts with regal authority, he is nowhere represented as speaking of himself in the plural number. Let it be observed, too, that whenever this phraseology was introduced among men, the plural noun was in every grammatical tongue joined to a plural verb; whereas Moses not only puts the noun and the verb in different numbers in the verse under consideration, but afterwards represents the אלהים as saying, "let *us* make man in *our* image;" and, "behold the man is become as *one of us*." Such phrases as these last were never used by a single man, and therefore cannot have been borrowed from human idioms.

Do they then denote a plurality of gods? No; there is nothing which the scriptures more frequently or more earnestly inculcate than the unity of the divine nature. The texts asserting this great and fundamental truth are almost numberless. "Unto thee (says Moses to his countrymen) it was shewed, that thou mightest know that the Lord is God; there is *none else besides him*. Know therefore that the Lord *he is God* in heaven above and upon the earth beneath: *there is none else*. And again, "Hear, O Israel, the Lord our God is *one Lord*," or, as it is expressed in the original, "Jehovah our God is one Jehovah," one Being to whom existence is essential, who could not have a beginning and cannot have an end. In the prophecies of Isaiah, God is introduced as repeatedly declaring †, "I am Jehovah, and there is *none else*; there is *no God besides me*; that they may know from the rising of the sun and from the west, that there is *none besides me*: I am Jehovah, and there is *none else*:"

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Is there a God besides me? Yea there is *no God*; I know not any." In perfect harmony with these declarations of Moses and the prophets, our Saviour, addressing himself to his Father, says ‡, "This is life eternal, that they might know *Thee, the only true God*, and Jesus Christ whom Thou hast sent;" and St Paul, who derived his doctrine from his divine Master, affirms ||, that "an idol is nothing in the world; and that there is *none other God but one*." 4.

The unity of the divine nature, which, from the order and harmony of the world, appears probable to human reason, these texts of revelation put beyond a doubt. Hence the first precept of the Jewish law, and, according to their own writers, the foundation of their whole religion, was, "Thou shalt have none other gods before Me." Hence, too, the reason of that strict command to Jews and Christians to give divine worship to none but God: "Thou shalt worship the Lord thy God, and him only shalt thou serve;" because he is *God alone*. Him only must we fear, because he alone hath infinite power; in him alone must we trust, because "he only is our rock and our salvation;" and to him alone must we direct our devotions, because "he only knoweth the hearts of the children of men."

It is past dispute, then, that the word אלהים does not indicate a plurality of gods. In the opinion, however, of many eminent divines, it denotes, by its junction with the singular verb, a plurality of persons in the one Godhead; and some few have contended, that by means of this peculiar construction, the Christian doctrine of the Trinity may be proved from the first chapter of the book of Genesis. To this latter opinion we can by no means give our assent. That there are three distinct persons in the one divine nature may be inferred with sufficient evidence from a multitude of passages in the Old and New Testaments diligently compared together; but it would perhaps be rash to rest the proof of so sublime a mystery upon any single text of holy scripture, and would certainly be so to rest it upon the text in question. That Moses was acquainted with this doctrine, we, to whom it has been explicitly revealed, may reasonably conclude from his so frequently making a plural name of God to agree with a verb in the singular number; but had we not possessed the brighter light of the New Testament to guide us, we should never have thought of drawing such an inference. For supposing the word אלהים to denote clearly a plurality of persons, and that it cannot possibly signify any thing else, how could we have known that the number is neither more nor less than three, had it not been ascertained to us by subsequent revelations?

There are indeed various passages in the Old Testament, of the phraseology of which no rational account can be given, but that they indicate more than one person in the Godhead. Such are those texts already noticed; "and the Lord God said, let *us* make man in *our* image, after *our* likeness;" and "the Lord God said, behold the man is become like *one of us*." To these may be added the following, which are to us perfectly unintelligible upon any other supposition; "and the Lord God said, let *us* go down, and there confound their language †." "If I be a *Master* (in the Hebrew *adonim*, MASTERS), where is my fear ‡?" "The fear of the Lord (JEHOVAH) is the beginning of wisdom, and the knowledge of the Holy (in the Hebrew HOLY ONES) is understanding ||." "Remember thy Creator (Hebrew, thy CREATORS) in the days of thy youth *." "And now the LORD GOD and his SPIRIT hath sent me §." "Seek ye out of the book of the LORD and read; for my mouth it hath commanded, and his SPIRIT it hath gathered them ¶." 60

That these texts imply a plurality of divine persons, seems to us incontrovertible. It has been already observed, that when Moses represents God as saying, let *us*

God and
his attri-
butes.

John xvii.

1 Cor viii.

Denotes a
plurality of
persons in
the God-
head.

† Gen. xi.

‡ The 6, 7.

† Mal. i. 6.

|| Prov. ix.

10.

* Eccl.

xii. 1.

§ Isaiah

xlviii. 16.

¶ Isaiah

xxxiv. 16.

God and
his attri-
butes.

make man, the majesty of the plural number had not been adopted by earthly sovereigns; and it is obvious that the Supreme Being could not, as has been absurdly supposed, call upon angels to make man; for in different places of * Job ix. 8. scripture * creation is attributed to God alone. Hence it is that Solomon speaks of Creators in the plural number, though he means only the one Supreme Being, and exhorts men to remember them in the days of their youth. In the passage first quoted from Isaiah, there is a distinction made between the Lord God and his Spirit; and in the other, three divine persons are introduced, viz. the Speaker, the Lord, and the Spirit of the Lord. It does not, however, appear evident from these passages, or from any other that we recollect in the Old Testament, that the persons in Deity are three and no more: but no sober Christian will harbour a doubt but that the precise number was by some means or other made known to the ancient Hebrews; for inquiries leading to it would be naturally suggested by the form in which the high-priest was commanded to bless the people. "The LORD bless thee and keep thee. The LORD make his face to shine upon thee, and be gracious unto thee. The LORD lift up his countenance upon thee, and give thee peace †." † Numb. vi. 24, 25, 26.

Of this benediction it has been well observed, that if its three articles be attentively considered, they will be found to agree respectively to the three persons taken in the usual order of the FATHER, the SON, and the HOLY GHOST. The Father is the author of blessing and preservation. Grace and illumination are from the Son, by whom we have "the light of the knowledge of the glory of God, in the face of Jesus Christ." Peace is the gift of the Spirit, whose name is the Comforter, and whose first and best fruit is the work of peace (1).

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A Trinity
in unity the
doctrine of
scripture.

Similar to this benediction, but much more explicit, is the form of Christian baptism; which, to us who live under the sunshine of the gospel, establishes the truth of the doctrine of the Trinity beyond all reasonable ground of dispute. "Go (says our blessed Saviour) and teach all nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghost." What was it the apostles, in obedience to this command, were to teach all nations? Was it not to turn from their vanities to the living God; to renounce their idols and false gods, and so to be baptized in the name of the Father, and of the Son, and of the Holy Ghost? What now must occur to the Gentile nations upon this occasion, but that, instead of all their deities, to whom they had before bowed down, they were in future to serve, worship, and adore, Father, Son, and Holy Ghost, as the only true and living God? To suppose that God and two CREATURES are here joined together in the solemn rite by which men were to be admitted into a new religion, which directly condemns all creature-worship, would be so extravagantly unreasonable, that we are persuaded such a supposition never was made by any converted Polytheist of antiquity. The nations were to be baptized in the name of three persons, in the same manner, and therefore, doubtless, in the same sense. It is not said in the name of God and his two faithful servants; nor in the name of God, and

CHRIST, and the HOLY GHOST, which might have suggested a thought that one only of the three is God; but in the name of the FATHER, and of the SON, and of the HOLY GHOST. Whatever honour, reverence, or regard, is paid to the first person in this solemn rite, the same we cannot but suppose paid to all three. Is he acknowledged as the object of worship? So are the other two likewise. Is he God and Lord over us? So are they. Are we enrolled as subjects, servants, and soldiers, under him? So are we equally under all. Are we hereby regenerated and made the temple of the Father? So are we likewise of the Son and Holy Ghost. "We will come (says our Saviour †) and make our abode with him." † John xiv. 23.

If those who believe the inspiration of the scriptures could require any further proof that the Godhead comprehends a Trinity of persons in one nature, we might urge upon them the apostolical form of benediction; "The grace of our LORD JESUS CHRIST, and the love of God, and the communion of the HOLY GHOST, be with you all *." * 2 Cor. xiii. 14. Would St Paul, or any other man of common sense, have in the same sentence, and in the most solemn manner, recommended his Corinthian converts to the love of God, and to the grace and communion of two creatures? We should think it very absurd to recommend a man at once to the favour of a king and a beggar; but how infinitely small is the distance between the greatest earthly potentate and the meanest beggar when compared with that which must for ever subsist between the Almighty Creator of heaven and earth and the most elevated creature?

But how, it will be asked, can three divine persons be but one and the same God? This is a question which has been often put, but which, we believe, no created being can fully answer. The divine nature and its manner of existence is, to us, wholly incomprehensible; and we might with greater reason attempt to weigh the mountains in a pair of scales, than by our limited faculties to fathom the depths of infinity. The Supreme Being is present in power to every portion of space, and yet it is demonstrable, that in his essence he is not extended (see METAPHYSICS, n° 309, 310). Both these truths, his inextension and omnipresence, are fundamental principles in what is called natural religion; and when taken together they form, in the opinion of most people, a mystery as incomprehensible as that of the Trinity in unity. Indeed there is nothing of which it is more difficult for us to form a distinct notion than unity simple, and absolutely indivisible; and we are persuaded that such of our readers as have been accustomed to turn their thoughts inwards, and reflect upon the operations of their own minds, will acknowledge the difficulty is not much less to them. Though the Trinity in unity, therefore, were no Christian doctrine, mysteries must still be believed; for they are as inseparable from the religion of nature as from that of revelation; and atheism involves the most incomprehensible of all mysteries, even the beginning of existence without a cause. We must indeed form the best notions that we can of this and of all other mysteries; for if we have no notions whatever of a Trinity in unity, we can neither believe nor

(1) Petrus Alphonsi, an eminent Jew, converted in the beginning of the 12th century, and presented to the pont by Alphonsus a king of Spain, wrote a learned treatise against the Jews, wherein he presses them with this scripture, as a plain argument that there are three persons to whom the great and incommunicable name of *Jehovah* is applied. And even the unconverted Jews, according to Bechai, one of their Rabbies, have a tradition, that when the high-priest pronounced this blessing over the people—*elevatione manuum sic digitos composuit, ut Triada exprimerent*, "he lifted up his hands, and disposed his fingers into such a form as to express a Trinity." All the foundation there is for this in the scripture, is Lev. ix. 22. As for the rest, be it a matter of fact or not, yet if we consider whence it comes, there is something very remarkable in it. See *Observ. Jos. de voif. in Pug. Fid. p. 400, 556, 557.*

God and his attributes. nor disbelieve that doctrine. It is however to be remembered, that all our notions of God are more or less analogical; that they must be expressed in words which, literally interpreted, are applicable only to man; and that propositions understood in this literal sense may involve an apparent contradiction, from which the truth meant to be expressed by them would be seen to be free, had we direct and adequate conceptions of the divine nature. On this account it is to be wished that men treating of the mystery of the holy Trinity, had always expressed themselves in scripture language, and never aimed at being wise beyond what is written; but since they have acted otherwise, we must, in justice to our readers, animadvert upon one or two statements of this doctrine, which we have reason to believe are earnestly contended for by some who consider themselves as the only orthodox.

In the scriptures, the three persons are denominated by the terms FATHER, SON, and HOLY GHOST, or by GOD, the WORD, who is also declared to be God, and the SPIRIT OF GOD. If each be truly God, it is obvious that they must all have the same divine nature, just as every man has the same human nature with every other man; and if there be but ONE God, it is equally obvious that they must be of the same individual substance or essence, which no three men can possibly be. In this there is a difficulty; but, as will be seen by and by, there is no contradiction. The very terms FATHER and SON imply such a relation between the two persons so denominated, as that though they are of the same substance, possessed of the same attributes, and equally God, just as a human father and his son are equally men, yet the second must be personally subordinate to the first. In like manner, the HOLY GHOST, who is called the Spirit of God, and is said to proceed from the Father, and to be sent by the Son, must be conceived as subordinate to both, much in the same way as a son is subordinate to his parents, tho' possessed of equal or even of superior powers. That this is the true doctrine, appears to us undeniable from the words of our Saviour himself, who, in a prayer addressed to his Father, styles him by way of pre-eminence, "the only true God," as being the fountain or origin of the Godhead from which the Son and the Holy Ghost derive their true divinity. In like manner, St Paul, when opposing the polytheism of the Greeks, says expressly ‡, that "to us there is but one God, THE FATHER, OF whom are all things, and we in, or for, him; and one LORD JESUS CHRIST, BY whom are all things, and we by him."

That the primitive fathers of the Christian church maintained this subordination of the second and third persons of the blessed Trinity to the first, has been evinced with such complete evidence by bishop Bull, that we do not perceive how any man can read his works and entertain a doubt on the subject. We shall transcribe two quotations from him, and refer the reader for fuller satisfaction to *sect. 4. of his Defensio fidei Nicenæ*. The first shall be a passage cited from *Novatian*, or whoever is the author of the book on the Trinity published among the works of Tertullian, in which the learned prelate assures us the sense of all the ancients is expressed. "Quia quid est Filius, non ex se est, quia nec innatus est; sed ex patre est, quia genitus est: five dum verbum est, five dum virtus est, five dum sapientia est, five dum lux est, five dum Filius est, et quicquid horum est, non aliunde est quam ex Patre, Patri suo originem suam debens." The next is from Athanasius, who has never been accused of holding low opinions respecting the second person of the holy Trinity. This father, in his fifth discourse against the Arians, says, καὶ ἡ γὰρ τοῦ ἱωάννου ἐν ταύτῃ τῇ ἀρχῇ ἡν ὁ λόγος καὶ ὁ λόγος, ἡν πρὸς τὸν θεόν. Θεὸς γὰρ ἐστὶν ἡ ἀρχή, καὶ ἐκείνου ἐξ αὐτοῦ ἐστὶ, διὰ τοῦτο καὶ θεὸς ἡν ὁ λόγος; according to John, the word was in this first prin-

ciple, and the word was God. For God is the principle; and because the word is from the principle, therefore the word is God. Agreeably to this doctrine, the Nicene fathers, in the creed which they published for the use of the universal church, style the only begotten Son, GOD OF GOD

Regardless however of antiquity, and, as we think, of the plain sense of scripture, some modern divines of great learning contend, that the three persons in Deity are all consubstantial, co-eternal, co-ordinate, without derivation, subordination, or dependence, of any sort, as to nature or essence; whilst others affirm, that the second and third persons derive from the first their personality, but not their nature. We shall consider these opinions as different, though, from the obscurity of the language in which we have always seen them expressed, we cannot be certain but they may be one and the same. The maintainers of the former opinion hold, that the three persons called *Elohim* in the Old Testament, naturally independent on each other, entered into an agreement before the creation of the world, that one of them should in the fulness of time assume human nature, for the purpose of redeeming mankind from that misery into which it was foreseen that they would fall. This antemundane agreement, they add, constitutes the whole of that paternal and filial relation which subsists between the first and second persons whom we denominate Father and Son; and they hold, that the Son is said to be begotten before all worlds, to indicate that *He* who was before all worlds was begotten, or to be begotten, into the office of redeemer; or, more decisively, to signify that he undertook that office before the creation, and assumed to himself some appearance or figure of the reality in which he was to execute it; and he is called μονογενής or the only begotten, because he alone was begotten into the office of redeemer*.

To many of our readers we doubt not but this will appear a very extraordinary doctrine, and not easy to be reconciled with the unity of God. It is however sufficiently overturned by two sentences of holy scripture, about the meaning of which there can be no dispute. "In this (says St John †) was manifested the love of God towards us, † John iv because that God sent his only begotten Son into the world, 9. that we might live through him." Taking the word *son* in its usual acceptation, this was certainly a wonderful degree of love in the Father of mercies to send into the world on our account a person so nearly related to him as an only son; but if we substitute this novel interpretation of the words *only begotten son* in their stead, the apostle's reasoning will lose all its force. St John will then be made to say, "In this was manifested the love of God toward us, because that God sent a divine person equal to himself, and no way related to him, but who had before the creation covenanted to come into the world, that we might live through him." Is this a proof of the love of the person here called God? Again, the inspired author of the epistle to the Hebrews, treating of our Saviour's priesthood, says, among other things expressive of his humiliation, that "though he was a son, yet learned he obedience (or, as others would render the words ἐμαθεν ὑπακοήν, he taught obedience) by the things which he suffered ‡." If the word *son* be here understood in its proper sense, this verse displays in a very striking manner the condescension of our divine Redeemer, who, though he was no less a person than the proper Son of God by nature, yet vouchsafed to learn or teach us obedience by the things which he suffered; but if we substitute this metaphorical sonship in place of the natural, the reasoning of the author (for that he is reasoning cannot be denied) will be very extraordinary. "Though this divine personage agreed before all worlds to suffer death for the redemption of man, yet learned he obedience, or yet taught

* See Ridgeley's Body of Divinity.

65 The expression of scripture.

† John iv

9.

‡ Heb. v. 8.

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his attri-
butes.

he us obedience, by the things which he suffered." What sense is there in this argument? Is it a proof of condescension to fulfil one's engagement? Surely, if the meaning of the word *son*, when applied to the second person of the blessed Trinity, were what is here supposed, the inspired writer's argument would have been more to the purpose for which it is brought had it run thus; "Though he was not a son, *i. e.* though he had made no previous agreement, yet condescended he to learn or teach," &c.

The other opinion, which supposes the Son and the Holy Ghost to derive from the Father their personality, but not their nature, is to us wholly unintelligible; for personality cannot exist, or be conceived in a state of separation from all natures, any more than a quality can exist in a state of separation from all substances. The former of these opinions we are unable to reconcile with the unity of God; the latter is clothed in words that have no meaning. Both, as far we can understand them, are palpable polytheism; more palpable indeed than that of the Grecian philosophers, who though they worshipped gods many, and lords many, yet all held one God supreme over the rest. See POLYTHEISM, n^o 32.

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The second
and third
persons not
posterior to
the first.

But if the Son and the Holy Ghost derive their nature as well their personality from the Father, will it not follow that they must be posterior to him in time, since every effect is posterior to its cause? No; this consequence seems to follow only by reasoning too closely from one nature to another, when there is between the two but a very distant analogy. It is indeed true, that among men, every father must be prior in time as well as in the order of nature to his son; but were it essential to a man to be a father, so as that he could not exist otherwise than in that relation, it is obvious that his son would be coeval with himself, though still as proceeding from him, he would be posterior in the order of nature. This is the case with all necessary causes and effects. The visible sun is the immediate and necessary cause of light and heat, either as emitting the rays from his own substance, or as exciting the agency of a fluid diffused for that purpose through the whole system. Light and heat therefore must be as old as the sun; and had he existed from all eternity, they would have existed from eternity with him, though still, as his effects, they would have been behind him in the order of nature. Hence it is, that as we must speak analogically of the Divine nature, and when treating of mind, even the Supreme mind, make use of words literally applicable only to the modifications of matter, the Nicene fathers illustrate the eternal generation of the second person of the blessed Trinity by this procession of light from the corporeal sun, calling him *God of God, light of light*.

Another comparison has been made use of to enable us to form some notion, however inadequate, how three Divine persons can subsist in the same substance, and thereby constitute but one God. Moses informs us, that man was made after the image of God. That this relates to the soul more than to the body of man, has been granted by all but a few gross anthropomorphites; but it has been well observed §, that the soul, though in itself one indivisible and unextended substance, is conceived as consisting of three principal faculties, the *understanding*, the *memory*, and the *will*. Of these, though they are all coeval in time, and equally essential to a rational soul, the understanding is in the order of nature obviously the first, and the memory the second; for things must be perceived before they can be remembered; and they must be remembered and compared together before they can excite volitions, from being, some agreeable, and others disagreeable. The memory therefore may be said to spring from the understanding, and the will

§ Leslie's
Nicæan
Controversy.

from both; and as these three faculties are conceived to constitute one soul, so may three Divine persons partaking of the same individual nature or essence constitute one God.

These parallels or analogies are by no means brought forward as proofs of the Trinity, of which the evidence is to be gathered wholly from the word of God; but they serve perhaps to help our labouring minds to form the justest notions of that adorable mystery which it is possible for us to form in the present state of our existence; and they seem to rescue the doctrine sufficiently from the charge of contradiction, which has been so often urged against it by Unitarian writers. To the last analogy we are aware it has often been objected, that the soul may as well be said to consist of ten or twenty faculties as of three, since the passions are equally essential to it with the understanding, the memory, and the will, and are as different from one another as these three faculties are. This, however, is probably a mistake; for the best philosophy seems to teach us, that the passions are not innate; that a man might exist through a long life a stranger to many of them; and that there are probably no two minds in which are generated *all* the passions (see PASSION); but understanding, memory, and will, are absolutely and equally necessary to every rational being. But whatever be in this, if the human mind can be conceived to be one indivisible substance, consisting of different faculties, whether many or few, why should it be thought an impossibility for the infinite and eternal nature of God to be communicated to three persons acting different parts in the creation and government of the world, and in the great scheme of man's redemption.

To the doctrine of the Trinity many objections have been made, as it implies the divinity of the Son and the Holy Ghost; of whom the former assumed our nature, and in it died for the redemption of man. These we shall notice when we come to examine the revelations more peculiarly Christian; but there is one objection which, as it respects the doctrine in general, may be properly noticed here. It is said that the first Christians borrowed the notion of a Tri-une God from the later Platonists; and that we hear not of a Trinity in the church till converts were made from the school of Alexandria. But if this be the case, we may properly ask, whence had those Platonists the doctrine themselves? It is not surely so simple or so obvious as to be likely to have occurred to the reasoning mind of a Pagan philosopher; or if it be, why do Unitarians suppose it to involve a contradiction? Plato indeed taught a doctrine in some respects similar to that of the Christian Trinity, and so did Pythagoras, with many other philosophers of Greece and the East (see PLATONISM, POLYTHEISM, and PYTHAGORAS); but tho' these sages appear to have been on some occasions extremely credulous, and on others to have indulged themselves in the most mysterious speculations, there is no room to suppose that they were *naturally weaker men* than ourselves, or that they were capable of inculcating as truths what they perceived to involve a contradiction. The Platonic and Pythagorean Trinities never could have occurred to the mind of him who merely from the works of creation endeavoured to discover the being and attributes of the Creator; and therefore as those philosophers travelled into Egypt and the East in quest of knowledge, it appears to us in the highest degree probable, that they picked up this mysterious and sublime doctrine in those regions where it had been handed down as a dogma from the remotest ages, and where we know that science was not taught systematically, but detailed in collections of sententious maxims and traditionary opinions. If this be so, we cannot doubt but that the Pagan Trinities had their origin in some primeval reve-

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Objections

69
Answered

God and
his attri-
butes.
67
No contra-
diction in
the Catho-
lic doctrine
of the Tri-
nity.

God and
his attri-
butes.

revelation. Nothing else indeed can account for the general prevalence of a doctrine so remote from human imagination, and of which we find vestiges in the sacred books of almost every civilized people of antiquity. The corrupt state in which it is viewed in the writings of Plato and others, is the natural consequence of its descent through a long course of oral tradition; and then falling into the hands of men who bent every opinion as much as possible to a conformity with their own speculations. The Trinity of Platonism therefore, instead of being an objection, lends, in our opinion, no feeble support to the Christian doctrine, since it affords almost a complete proof of that doctrine's having made part of the first revelations communicated to man.

Having thus discovered that the one God, to whom Moses gives the plural name *Elohim*, comprehends three persons; let us now inquire what power this Triune God exerted, when, as the same sacred writer informs us, he created the heaven and the earth. That by the heaven and the earth is here meant the whole universe, visible and invisible, is known to every person acquainted with the phraseology of Scripture; and we need inform no man conversant with English writers, that by *creation*, in its proper sense, is meant bringing into *being*, or making that to *exist* which existed not *before*. It must, however, be acknowledged, that the Hebrew word *ברא* does not always imply the production of substance, but very often the forming of particular organized bodies out of pre-existing matter. Thus when it is said * that "God *created* great whales, and every living creature that moveth, which the waters brought forth abundantly after their kind," and again, that "he *created* man male and female;" though the word *ברא* is used on both occasions, we are not to conceive that the bodies of the first human pair, and of these animals, were brought into being from nonentity, but only that they were formed by a proper organization being given to pre-existent matter. But when Moses says, "In the beginning God *created* the heaven and the earth," he cannot be supposed to mean that "in the beginning God only gave form to matter already existing of itself;" for in the very next verse we are assured that after this act of creation was over, "the earth was still *without form* and void," or, in other words, in a chaotic state.

That the Jews, before the coming of our Saviour, understood their lawgiver to teach a proper creation, is plain from that passage in the second book of the Maccabees, in which a mother, to persuade her son to suffer the cruellest tortures rather than forsake the law of his God, uses the following argument: "I beseech thee, my son, look upon the heaven and the earth, and all that is therein, and consider that God made them of things that were not." To the same purpose the inspired author of the epistle to the Hebrews, when magnifying the excellence of faith, says, "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear;" where, as bishop Pearson has ably proved ||, the phrase *μη ἐκ υἱομένων* is equivalent to *οὐκ ἐξ οὐλῶν*, in the quotation from the Maccabees.

The very first verse, therefore, of the book of Genesis informs us of a most important truth, which all the uninspired wisdom of antiquity could not discover. It assures us, that as nothing exists by chance, so nothing is necessarily existing but the three divine persons in the one Godhead. Every thing else, whether material or immaterial, derives its substance, as well as its form or qualities, from the fiat of that self-existent Being, "who was, and is, and is to come."

It does not, however, follow from this verse, or from any

other passage in the sacred Scriptures, that the whole universe was called into existence at the same instant; neither is it by any means evident that the chaos of our world was brought into being on the first of those six days during which it was gradually reduced into form. From a passage † in the book of Job, in which we are told by God himself, that when the "foundation of the earth was laid the morning stars sang together, and all the sons of God shouted for joy," it appears extremely probable that worlds had been created, formed, and inhabited, long before our earth had any existence. Nor is this opinion at all contrary to what Moses says of the creation of the stars; for though they are mentioned in the same verse with the sun and moon, yet the manner in which, according to the original, they are introduced, by no means indicates that all the stars were formed at the same time with the luminaries of our system. Most of them may have been created long before, and some of them since, our world was brought into being; for that clause (verse 16.) "he made the stars also," is in the Hebrew no more than "and the stars;" the words *he made* being inserted by the translators. The whole verse therefore ought to be rendered thus, "and God made two great lights; the greater light to rule the day, and the lesser light with the stars to rule the night;" where nothing is intimated with respect to the *time* when the stars were formed, any more than in that verse of the Psalms ||, which exhorts us to give thanks to God who made the moon and stars to rule by night; for his mercy endureth "for ever." The first verse of the book of Genesis informs us, that all things spiritual and corporeal derive their existence from God; but it is nowhere said that all matter was created at the same time; and the generations of men afford sufficient evidence of a successive and continual creation of spirits.

That the whole corporeal universe *may have been* created at once must be granted; but if so, we have reason to believe that this earth, with the sun and all the planets of the system, were suffered to remain for ages in a state of chaos, "without form and void;" because it appears from other scriptures, that worlds of intelligent creatures existed, and even that some angels had fallen from a state of happiness prior to the era of the Mosaic cosmogony. That the sun and the other planets revolving round him were formed at the same time with the earth, cannot indeed be questioned; for it is not only extremely probable in itself from the known laws of nature, but is expressly affirmed by the sacred historian, who relates the formation of the sun and moon in the order in which it took place. Into the particulars of his narrative we have no occasion to enter, as it is sufficiently explained and vindicated in other articles of this work (see CREATION and EARTH); but there is one difficulty which, though we have given the common solutions of it elsewhere, we may again notice in this place, because it has furnished infidel ignorance with something like an objection to the divine legation of the Hebrew lawgiver.

Moses informs us, that on the *first day* after the production of the chaos, the *element of light* was created; and yet within a few sentences he declares, that the sun, the fountain of light, was not made till the *fourth day*. How are these two passages to be reconciled? We answer, That they may be reconciled many ways. Moses wrote for the use of a whole people, and not for the amusement or instruction of a few astronomers; and in this view his language is sufficiently proper, even though we suppose the formation of the sun and the other planets to have been carried on at the same time, and in the same progressive manner, with the formation of this earth. The voice which called light into existence would separate the fiery and luminous particles of

God and
his attri-
butes.

71
The whole
universe
not created
at once.
xxxviii. 7.

72
Psalms
cxxxvi. 9.

73
The solar
system cre-
ated at once.

74
A difficulty
solved.

* Gen. i.
21, 27.

70
Creation
taught by
Moses.

|| Exposition
of the Creed.

God and
his attri-
butes.

the chaos from those which were opaque, and, on this hypothesis, consolidate them in one globe, diffusing an obscure light through the planetary system; but if the earth's atmosphere continued till the fourth day loaded with vapours, as from the narrative of Moses it appears to have done, the sun could not till *that day* have been *seen* from the earth, and may therefore, in popular language, be said with sufficient propriety to have been *formed* on the fourth day, as it was then first made to *appear*. (See CREATION, n° 13. and EARTH, n° 108, 174, 175). But though this solution of the difficulty serves to remove the infidel objection, and to secure the credit of the sacred historian, candour compels us to confess that it appears not to be the true solution.

The difficulty itself arises entirely from supposing the sun to be the sole fountain of light; but the truth of this opinion is not self-evident, nor has it ever been established by satisfactory proof. It is indeed to a mind divested of undue deference to great names, and considering the matter with impartiality, an opinion extremely improbable. The light of a candle placed upon an eminence may in a dark night be seen in every direction at the distance of at least three miles. But if this small body be rendered visible by means of rays emitted from itself, the flame of a candle, which cannot be supposed more than an inch in diameter, must, during every instant that it continues to burn, throw from its own substance luminous matter sufficient to fill a spherical space of six miles in diameter. This phenomenon, if real, is certainly surprising; but if we pursue the reflection a little farther, our wonder will be greatly increased. The matter which, when converted into flame, is an inch in diameter, is not, when of the consistence of cotton and tallow, of the dimensions of the 20th part of an inch; and therefore, upon the common hypothesis, the 20th part of an inch of tallow may be so rarefied as to fill a space of 113,0976 cubic miles! a rarefaction which to us appears altogether incredible. We have indeed heard much of the divisibility of matter *ad infinitum*, and think we understand what are usually called *demonstrations* of the truth of that proposition; but these demonstrations prove not the actual divisibility of real solid substances, but only that upon trial we shall find no end of the ideal process of dividing and subdividing imaginary extension.

Upon the whole, therefore, we are much more inclined to believe that the matter of light is an extremely subtle fluid, diffused through the corporeal universe, and only excited to agency by the sun and other fiery bodies, than that it consists of streams continually issuing from the substance of these bodies. It is indeed an opinion pretty generally received, and certainly not improbable in itself, that light and electricity are one and the same substance (see *ELECTRICITY-Index*); but we know that the electrical fluid, though pervading the whole of corporeal nature, and, as experiments show, capable of acting with great violence, yet lies dormant and unperceived till its agency be excited by some foreign cause. Just so it may be with the matter of light. That substance may be "diffused from one end of the creation § to the other, it may traverse the whole universe, form a communication between the most remote spheres, penetrate into the inmost recesses of the earth, and only wait to be put in a proper motion to communicate visible sensations to the eye. Light is to the organ of sight what the air is to the organ of hearing. Air is the medium which, vibrating on the ear, causes the sensation of sound; but it equally exists round us at all times, though there be no sonorous body to put it in motion. In like manner, light may be equally extended at all times, by night as well as by day, from the most distant fixed stars to this earth, tho' it then only strikes our eyes so as to excite visible sensations when impelled by the sun or some other mass of fire." Nor

§ Nature
displayed.

let any one imagine that this hypothesis interferes with any of the known laws of optics; for if the rays of light be impelled in straight lines, and in the same direction in which they are supposed to be emitted, the phenomena of vision must necessarily be the same.

Moses therefore was probably a more accurate philosopher than he is sometimes supposed to be. The element of light was doubtless created, as he informs us, on the first day; but whether it was then put in that state in which it is the medium of vision, we cannot know, and we need not inquire, since there was neither man nor inferior animal with organs fitted to receive its impressions. For the first three days it may have been used only as a powerful instrument to reduce into order the jarring chaos. Or if it was from the beginning capable of communicating visible sensations, and dividing the day from the night, its agency must have been immediately excited by the Divine power till the fourth day, when the sun was formed, and endowed with proper qualities for instrumentally discharging that office. This was indeed miraculous, as being contrary to the present laws of nature: but the whole creation was miraculous; and we surely need not hesitate to admit a less miracle where we are under the necessity of admitting a greater. The power which called light and all other things into existence, could give them their proper motions by ten thousand different means; and to attempt to solve the difficulties of creation by philosophic theories respecting the laws of nature, is to trifle with the common sense as well as the piety of mankind: it is to consider as subservient to a law that very power by whose continued exertion the law is established.

Having thus proved that the universe derives its being, as well as the form and adjustment of its several parts, from the one supreme and self-existent God, let us here pause, and reflect on the sublime conceptions which such astonishing works are fitted to give us of the Divine perfections.

And, in the first place, how strongly do the works of creation impress upon our minds a conviction of the infinite power of their Author? He spoke, and the universe started into being; he commanded, and it stood fast. How mighty is the arm which "stretched out the heavens and laid the foundations of the earth; which removeth the mountains, and they know it not; which overturneth them in his anger; which shaketh the earth out of her place, and the pillars thereof tremble! How powerful the word which commandeth the sun, and it riseth not; and which sealeth up the stars;" which sustaineth numberless worlds of amazing bulk suspended in the regions of empty space, and directs their various and inconceivably rapid motions with the utmost regularity! "Lift up your eyes on high, and behold, who hath created all these things? By the word of the Lord were the heavens made, and all the host of them by the breath of his mouth. Hell is naked before him, and destruction hath no covering. He stretcheth out the North over the empty place, and hangeth the earth upon nothing. He has measured the waters in the hollow of his hand, and meted out the heavens with a span; and comprehended the dust of the earth in a measure; and weighed the mountains in scales, and the hills in a balance. Behold! the nations are as a drop of the bucket, and are counted as the small dust of the balance; behold, he taketh up the isles as a very little thing. All nations before him are as nothing, and they are counted to him less than nothing, and vanity. To whom then will ye liken God, or what likeness will ye compare unto him?"

As the works of creation are the effects of God's power, they likewise in the most eminent manner display his wisdom. This was so apparent to Cicero, even from the partial

God and
his attri-
butes.

74
Moses a
found phi-
losopher.

75
Infinite
power of
the Crea-
tor,

¶ Pf. xxxiii.
6, 9.; Job
ix. 4, &c.
xxvi. 6.;
Isa xi. 12.

76
His wis-
dom,

God and his attributes. *De Nat. Deorum, lib. II.* partial and very imperfect knowledge in astronomy which his time afforded, that he declared § those who could assert the contrary void of all understanding. But if that great master of reason had been acquainted with the modern discoveries in astronomy, which exhibit numberless worlds scattered through space, and each of immense magnitude; had he known that the sun is placed in the centre of our system, and that to diversify the seasons the planets move round him with exquisite regularity; could he have conceived that the distinction between light and darkness is produced by the diurnal rotation of the earth on its own axis, instead of that disproportionate whirling of the whole heavens which the ancient astronomers were forced to suppose; had he known of the wonderful motions of the comets, and considered how such eccentric bodies have been preserved from falling upon some of the planets in the same system, and the several systems from falling upon each other; had he taken into the account that there are yet greater things than these, and "that we have seen but a few of God's works;"—that virtuous Pagan would have been ready to exclaim in the words of the Psalmist, "O Lord, how manifold are thy works! In wisdom hast thou made them all; the earth is full of thy riches."

77 And good. That creation is the offspring of unmixed goodness, has been already shown with sufficient evidence (see METAPHYSICS, n° 312. and n° 29. of this article); and from the vast number of creatures on our earth endowed with life and sense, and a capability of happiness, and the infinitely greater number which probably inhabit the planets of this and other systems, we may infer that the goodness of God is as boundless as his power, and that "as is his majesty, so is his mercy." Out of his own fulness hath he brought into being numberless worlds, replenished with myriads of myriads of creatures, furnished with various powers and organs, capacities and instincts; and out of his own fulness he continually and plentifully supplies them all with every thing necessary to make their existence comfortable. "The eyes of all wait upon him, and he giveth them their meat in due season. He openeth his hand and satisfies the desires of every living thing: he loveth righteousness and judgment; the earth is full of the goodness of the Lord. He watereth the ridges thereof abundantly; he setteth the furrows thereof; he maketh it soft with showers, and blesteth the springing thereof. He crowneth the year with his goodness; and his paths drop fatness. They drop upon the pastures of the wilderness; and the little hills rejoice on every side. The pastures are clothed with flocks; the valleys also are covered with corn; they shout with joy, they also sing *". Survey the whole of what may be seen on and about this terraqueous globe, and say, if our Maker hath a sparing and a niggardly hand. Surely the Author of so much happiness must be essential goodness; and we must conclude with St John, that "God is love."

78 The second person in the Trinity the immediate Creator. These attributes of power, wisdom, and goodness, so conspicuously displayed in the works of creation, belong in the same supreme degree to each person in the blessed Trinity; for Moses declares that the heaven and the earth were created, not by one person, but by the *Elohim*. The *λογος* indeed, or second person, appears to have been the immediate Creator; for St John assures us ||, that "all things were made by him, and that without him was not any thing made that was made." Some Arian writers of great learning (and we believe the late Dr Price was of the number) have asserted, that a being who was created himself may be endowed by the Omnipotent God with the power of creating other beings; and as they hold the *λογος* or word to be a creature, they contend that he was employed by the Supreme Deity to create, not the whole universe, but

only this earth, or at the utmost the solar system. "The old argument (says one of them), that no being inferior to the great Omnipotent can create a world, is so childish as to deserve no answer. Why may not God communicate the power of making worlds to any being whom he may choose to honour with so glorious a prerogative? I have no doubt but such a power may be communicated to many good men during the progress of their existence; and to say that it may not, is not only to limit the power of God, but to contradict acknowledged analogies."

We are far from being inclined to limit the power of God. He can certainly do whatever involves not a direct contradiction; and therefore, though we know nothing analogous to the power of creating worlds, yet as we perceive not any contradiction implied in the notion of that power being communicated, we shall admit that such a communication may be possible, though we think it in the highest degree improbable. But surely no man will contend that the whole universe was brought into existence by any creature; because that creature himself, however highly exalted, is necessarily comprehended in the notion of the universe. Now St Paul expressly affirms §, that, by the second person in the blessed Trinity, "were ALL things created that are in heaven, and that are in earth, visible and invisible, whether they be THRONES, or DOMINIONS, or PRINCIPALITIES, or POWERS; all things were created by him and for him; and he is before all things, and by him all things consist." Indeed the Hebrew Scriptures in more places than one † expressly declare that this earth, and of course the whole solar system, was formed as well as created, not by any inferior being, but by the true God, even *Jehovah* alone; and in the New Testament *, the Gentiles are said to be without excuse for not glorifying him as God, "because his eternal power and Godhead are clearly seen from the creation of the world." But if it were natural to suppose that the power of creating worlds has been, or ever will be, communicated to beings inferior to the great Omnipotent, this reasoning of the apostle's would be founded on false principles, and the sentence which he passed on the Heathen would be contrary to justice.

But though it be thus evident that the *λογος* was the immediate Creator of the universe, we are not to suppose that it was without the concurrence of the other two persons. The Father, who may be said to be the fountain of the Divinity itself, was certainly concerned in the creation of the world, and is therefore in the apostle's creed denominated the "Father Almighty, Maker of heaven and earth;" and that the Holy Ghost or third person is likewise a Creator, we have the express testimony of two inspired writers: "By the word of the Lord (says the Psalmist) were the heavens made, and all the host of them by the breath (Hebrew, SPIRIT) of his mouth." And Job declares, that the "SPIRIT of God made him, and that the breath of the Almighty gave him life." Indeed these three divine persons are so intimately united, that what is done by one must be done by all, as they have but one and the same will. This is the reason assigned by Origen * for our paying divine worship to each; *ὁρῶμεν οὖν τὸν πατέρα τῆς ἀληθείας καὶ τὸν υἱὸν τῆς ἀληθείας, οὐκ ἄλλο τῇ ὑποστάσει πράγματα, ἐν δὲ τῇ οὐνοῦσι καὶ τῇ συμφωνίᾳ καὶ τῇ ταυτῇ τῆς βουλῆς*, "we worship the Father of truth, and the Son the truth itself, being two things as to Hypostasis, but one in agreement, consent, and sameness of will." Nor is their union a mere agreement in will only; it is a physical or essential union: so that what is done by one must necessarily be done by the others also, according to that of our Saviour, "I am in the Father and the Father in me: The Father who dwelleth in me, he doth the works."

God and his attributes.

79 Creation peculiar to God.

§ Colof. iv. 17.

† Isa. xl. 12. xlv. 24. Jerem. x. 10—13. * Rom. i. 18—22.

Contr. Cel. p. 386.

Original
state of
man.

Thus we see, that to the several persons in the ever blessed Trinity is equal praise due for the creation of the world. Their all-powerful word commanded into being every thing that exists, and by the same Divine power is every thing continued in existence. Well therefore might the Psalmist call upon the heavens and the earth to praise the name of the Lord; "for he commanded, and they were created. He hath also established them for ever and ever; he hath made a decree which shall not pass. Let all things praise the name of the Lord; for his name *אבותינו*, Father, Son, and Holy Ghost, alone is excellent, and his glory above the earth and heaven."

SECT. II. *Of the Original State of Man, and the first Covenant of Eternal Life which God vouchsafed to make with him.*

80
Peculiarity
of the ex-
pression in
which God
is said to
make man

IN the Mosaic account of the creation, every attentive reader must be struck with the manner in which the supreme Being is represented as making man: "And God said, let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created man in his own image; in the image of God created he him; male and female created he THEM. And God blessed them; and God said unto them, be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. And God said, behold, I have given you every herb bearing seed, which is upon the face of all the earth; and every tree, in the which is the fruit of a tree yielding seed: to you it shall be for meat. And God saw every thing that he had made, and, behold, it was very good. And the evening and the morning were the sixth day. Thus the heavens and the earth were finished, and all the host of them. And on the seventh day God ended his work which he had made; and he rested on the seventh day from all his works which he had made. And God blessed the seventh day, and sanctified it: because that in it he had rested from all his work which God created and made $\dagger$."

† Gen. i.
26, &c. ii.
1, 2, 3.

This is a very remarkable passage, and contains much important information. It indicates a plurality of persons in the Godhead, describes the nature of man as he came at first from the hands of his Creator, and furnishes data from which we may infer what were the duties required of him in that primeval state, and what were the rewards to which obedience would entitle him.

81
In his own
image.

Of the plurality of Divine persons, and their essential union, we have treated in the preceding section, and proceed now to inquire into the specific nature of the first man. This must be implied in the *image of God*, in which he is said to have been created; for it is by that phrase alone that he is characterized, and his pre-eminence marked over the other animals. Now this image or likeness must have been found either in his body alone, his soul alone, or in both united. That it could not be in his body alone, is obvious; for the infinite and omnipotent God is allowed by all men to be without body, parts, or passions, and therefore to be such as nothing corporeal can possibly resemble.

82
Different
opinions re-
specting
the image
of God.

If this likeness is to be found in the human soul, it comes to be a question in what faculty or power of the soul it consists. Some have contended, that man is the only creature on this earth who is animated by a principle essentially different from matter; and hence they have inferred, that he is said to have been formed in the Divine image, on ac-

count of the immateriality of that vital principle which was infused into his body when the "Lord God breathed into his nostrils the breath of life, and man became a living soul $\S$." That this account of the animation of the body of man indicates a superiority of the human soul to the vital principle of all other animals, cannot, we think, be questioned; but it does not therefore follow, that the human soul is the only immaterial principle of life which animates any terrestrial creature. It has been shown elsewhere (see METAPHYSICS, n^o 235.), that the power of sensation, attended with individual consciousness, as it appears to be in all the higher species of animals, cannot result from any organical structure, or be the quality of a compound extended being. The vital principle in such animals therefore must be immaterial as well as the human soul; but as the word *immaterial* denotes only a negative notion, the souls of men and brutes, though both immaterial, may yet be substances essentially different. This being the case, it is plain that the Divine image in which man was formed, and by which he is distinguished from the brute creation, cannot consist in the mere circumstance of his mind being a substance different from matter, but in some positive quality which distinguishes him from every other creature on this globe.

About this characteristic quality very various opinions have been formed. Some have supposed $\parallel$ "that the image of God in Adam appeared in that rectitude, righteousness, and holiness, in which he was made; for God made man upright (Eccles. vii. 2.), a holy and righteous creature; which holiness and righteousness were in their kind perfect; his understanding was free from all error and mistakes; his will biassed to that which is good; his affections flowed in a right channel towards their proper objects; there were no sinful motions and evil thoughts in his heart, nor any propensity or inclination to that which is evil; and the whole of his conduct and behaviour was according to the will of God. And this righteousness (say they) was *natural*, and not personal and acquired. It was not obtained by the exercise of his free-will, but was created with him, and belonged to his mind, as a natural faculty or instinct." They therefore call it *original righteousness*, and suppose that it was lost in the fall.

To this doctrine many objections have been made. It has been said that righteousness consisting in right actions proceeding from proper principles, could not be created with Adam and make a part of his nature; because nothing which is produced in a man without his knowledge and consent can be in him either virtue or vice. Adam, it is added, was unquestionably placed in a state of trial, which proves that he had righteous habits to *acquire*; whereas the doctrine under consideration, affirming his original righteousness to have been perfect, and therefore incapable of improvement, is inconsistent with a state of trial. That his understanding was free from all errors and mistakes, has been thought a blasphemous position, as it attributes to man one of the incommunicable perfections of the Deity. It is likewise believed to be contrary to fact; for either his understanding was bewildered in error, or his affections flowed towards an improper object, when he suffered himself at the persuasion of his wife to transgress the express law of his Creator. The objector expresses his wonder at its having ever been supposed that the *whole* of Adam's conduct and behaviour was according to the will of God, when it is so notorious that he yielded to the first temptation with which, as far as we know, he was assailed in paradise.

Convinced by these and other arguments, that the image of God in which man was created could not consist in original righteousness, or in exemption from all possibility of error, many learned men, and Bishop Bull * among others, have

Original
state of
man.

Gen. ii.

83

Calvinistic
opinions.
Gill's
Body of Di-
vinity, b. iii.
ch. 3.

84

Objected

* See his
English
Works, vol.
have iii.

Original state of man. 85. Opinion of Bishop Bull and some of the ancient fathers § 1 Cor. xv. 45, 46. have supposed, that by the image of God is to be understood certain gifts and powers supernaturally infused by the Holy Spirit into the minds of our first parents, to guide them in the ways of piety and virtue. This opinion they rest chiefly upon the authority of Tatian, Irenæus, Tertullian, Cyprian, Athanasius, and other fathers of the primitive church; but they think, at the same time, that it is countenanced by several passages in the New Testament. Thus when St Paul says §, "and so it is written, The first man Adam was made a living soul, the last Adam was made a quickening Spirit;" they understand the whole passage as relating to the creation of man, and not as drawing a comparison between Adam and Christ, to show the great superiority of the latter over the former. In support of this interpretation they observe, that the apostle immediately adds, "howbeit, that was not first which is spiritual, but that which is natural, and afterwards that which is spiritual;" an addition which they think was altogether needless, if by the quickening Spirit he had referred to the incarnation of Christ, which had happened in the very age in which he was writing. They are therefore of opinion, that the body of Adam, after being formed of the dust of the ground, was first animated by a vital principle endowed with the faculties of reason and sensation, which entitled the whole man to the appellation of a living soul. After this they suppose certain graces of the Holy Spirit to have been infused into him, by which he was made a quickening spirit, or formed in the image of God; and that it was in consequence of this succession of powers communicated to the same person, that the apostle said, "Howbeit, that was not first which is spiritual, but that which is natural."

We need hardly observe, that with respect to a question of this kind the authority of *Tatian* and the other fathers quoted is nothing. Those men had no better means of discovering the true sense of the scriptures of the Old Testament than we have; and their ignorance of the language in which these scriptures are written, added to some metaphysical notions respecting the soul, which too many of them had derived from the school of Plato, rendered them very ill qualified to interpret the writings of Moses. Were authority to be admitted, we should consider that of bishop Bull and his modern followers as of greater weight than the authority of all the ancients to whom they appeal. But authority cannot be admitted; and the reasoning of this learned and excellent man from the text of St Paul is surely very inconclusive. It makes two persons of Adam; a first, when he was a natural man composed of a body and a reasonable soul; a second, when he was endowed with the gifts of the Holy Spirit and by them formed in the image of God! In the verse following too, the apostle expressly calls the second man, of whom he had been speaking, "the Lord from heaven;" but this appellation we apprehend to be too high for Adam in the state of greatest perfection in which he ever existed. That our first parents were endowed with the gifts of the Holy Ghost, we are strongly inclined to believe for reasons which shall be given by and by; but as these gifts were adventitious to their nature, they could not be that image in which God made man.

87. Other opinions. Since man was made in the image of God, that phrase, whatever be its precise import, must denote something peculiar and at the same time essential to human nature; but the only two qualities at once natural and peculiar to man are his shape and his reason. As none but an anthropomorphite will say that it was Adam's shape which reflected this image of his Creator, it has been concluded that it was the faculty of reason which made the resemblance. To give strength to this argument it is observed ‡, that when God says, "let us make man in our image," he immediately adds,

"and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth;" but as many of the cattle have much greater bodily strength than man, this dominion could not be maintained but by the faculty of reason bestowed upon him and withheld from them.

If the image of God was impressed only on the mind of man, this reasoning seems to be conclusive; but it has been well observed † that it was the whole man, and not the *soul* alone, or the *body* alone, that is said to have been formed in the divine image; even as the whole man, soul and body, is the seat of the new and spiritual image of God in regeneration and sanctification. "The very God of peace (says the apostle) sanctify you wholly; and may your whole *spirit, soul and body*, be preserved blameless to the coming of our Lord Jesus Christ." It is worthy of notice too, that the reason assigned for the prohibition of murder to Noah and his sons after the deluge, is, that man was made in the image of God. "Who so sheddeth man's blood, by man shall his blood be shed; for in the image of God made he man." These texts seem to indicate, that whatever be meant by the image of God, it was stamped equally on the soul and on the body. In vain is it said that man cannot resemble God in shape. This is true, but it is little to the purpose; for man does not resemble God in his reasoning faculty more than in his form. It would be idolatry to suppose the supreme majesty of heaven and earth to have a body or a shape; and it would be little short of idolatry to imagine that he is obliged to compare ideas and notions together; to advance from particular truths to general propositions; and to acquire knowledge, as we do, by the tedious processes of inductive and syllogistic reasoning. There can therefore be no direct image of God either in the soul or in the body of man; and the phrase really seems to import nothing more than those powers or qualities by which man was fitted to exercise dominion over the inferior creation; as if it had been said, "Let us make man in our image, after our likeness, that *they may have dominion*, &c." But the erect form of man contributes in some degree, as well as his rational powers, to enable him to maintain his authority over the brute creation; for it has been observed by travellers, that the fiercest beast of prey, unless ready to perish by hunger, shrinks back from a steady look of the human face divine.

By some *, however, who have admitted the probability of this interpretation, another, and in their opinion a still better reason, has been devised for its being said that man was formed in the image of God. All the members of Christ's body, say they, were written and delineated in the book of God's purposes and decrees, and had an ideal existence from eternity in the divine mind; and therefore the body of Adam might be said to be formed after the image of God, because it was made according to that idea. But to this reasoning objections may be urged, which we know not how to answer. All things that ever were or ever shall be, the bodies of us who live at present as well as the bodies of those who lived 5000 years ago, have from all eternity had an ideal existence in the Divine mind; nor in this sense can one be said to be prior to another. It could not therefore be after the idea of the identical body of Christ that the body of Adam was formed; for in the Divine mind ideas of both bodies were present together from all eternity, and each body was undoubtedly formed after the ideal archetype of itself. It may be added likewise, that the body of Christ was not God, nor the idea of that body the idea of God. Adam therefore could not with propriety, or even with truth, be said to have been formed in the image of God, if by that phrase nothing more were intended than the resemblance between his body and the body of Christ.

Original
state of
man.

These objections to this interpretation appear to us unanswerable; but we mean not to dictate to our readers. Every man will adopt that opinion which he thinks supported by the best arguments; but it is obvious, that whatever more may be meant by the image of God in which man was made, the phrase undoubtedly comprehends all those powers and qualities by which he is enabled to maintain his authority over the inferior creation. Among these the faculty of reason is confessedly the most important; for it is by it that man is capable of being made acquainted with the Author of his being, the relation which subsists between them, and the duties implied in that relation from the creature to the Creator.

89
Religious
instruction
communicated to
Adam.

That the first man, however, was not left to discover these things by the mere efforts of his own unassisted reason, we have endeavoured to show in another place; (See RELIGION, n° 5—10.); and the conclusion to which we were there led, is confirmed by the portion of revelation before us. The inspired historian says, that "God blessed the seventh day and sanctified it, because that in it he had rested from all his works, which he created and made;" but Adam could not have understood what was meant by the sanctification of a particular day, or of any thing else, unless he had previously received some religious instruction. There cannot therefore be a doubt, but that as soon as man was made, his Creator communicated to him the truths of what is called natural religion, which we have endeavoured to explain and establish in Part I. of this article; and to these were added the precept to keep holy the Sabbath-day, and set it apart for the purposes of contemplation and worship.

90
Institution
of the Sab-
bath.

This was a very wise institution, as all the divine institutions must be. "The great end for which we are brought into life, is to attain the knowledge and be confirmed in the love of God. This includes obedience to his will in thought, word, and deed, or that course of conduct which can alone make us happy here, and fit us for everlasting glory hereafter. But of these things we cannot retain a proper sense without close and repeated application of thought; and the unavoidable cares and concerns of the present life occupying much of our attention, it is, in the nature of things, necessary that some certain portion of time should be appropriated to the purposes of religious instruction and the public adoration of our Creator, in whom we all live, and move, and have our being." Hence a very learned divine† has inferred, that though the particular time is a matter of positive appointment, the observation of a sabbath in general is a duty of natural religion, as having its foundation in the reason of things. See SABBATH.

† Dr Tay-
lor of Nor-
wich.91
Duties of
man in his
original
state,

Man therefore in his natural and original state was a rational and religious being, bound to do "justice, to love mercy, to walk humbly with his God, and to keep holy the Sabbath-day." These seem to be all the duties which in that state were required of him; for as soon as he was introduced into the terrestrial paradise and admitted into covenant with his Maker, he was placed in a supernatural state, when other duties were of course enjoined.

|| Gen. i.
27. v. 2.

That our first parents were both made on the sixth day, Moses expressly affirms when he says ||, that "God created them male and female, and blessed them, and called their name Adam (κ), in the day when they were created:" but that they were introduced into the garden of Eden on that day, is an opinion which, however gene-

rally it may be received, seems not to be reconcileable with the plain narrative of the sacred penman. After telling us that on the sixth day God finished all his works, which he saw to be very good, and rested on the seventh day, he briefly recapitulates the history of the generations of the heavens and of the earth, gives us a more particular account of the formation of the first man, informing us that the "Lord God formed him out of the dust of the ground, and breathed into his nostrils the breath of life, when man became a living soul;" and then proceeds to say ‡, that the "Lord God planted a garden eastward in Eden, where he put the man whom he had formed." From this short history of the first pair it appears beyond dispute evident, that neither the man nor the woman was formed in the garden; and that from their creation some time elapsed before the garden was prepared for their reception, is likewise evident from a comparison of Gen. i. 29. with Gen. ii. 16, 17. In the first of these passages God gives to man, immediately after his creation, "every herb bearing seed which was upon the face of all the earth, and every tree, without exception, in which was the fruit of a tree bearing seed: to him he said it should be for meat." In the second, "he commanded the man, saying, of every tree of the garden thou mayest freely eat; but of the tree of knowledge of good and evil, thou shalt not eat of it; for in the day thou eatest thereof thou shalt surely die." When the first grant of food was given, Adam and his wife must have been where no tree of knowledge grew, and they must have been intended to live at least so long in that state as that they should have occasion for food, otherwise the formal grant of it would have been not only superfluous, but apt to mislead them with respect to the subsequent restriction.

Original
state of
man.Gen. ii.
7, 8, and
15.92
Before he
was placed
in the gar-
den of E-
den,

In this original state man was under the discipline of what we have called natural religion, entitled to happiness while he should perform the duties required of him, and liable to punishment when he should neglect those duties, or transgress the law of his nature as a rational and moral agent. This being the case, it is a matter of some importance, and what will enable us to perceive more clearly the prerogatives of Christianity, to ascertain, if we can, what the rewards and punishments are which natural religion holds out to her votaries.

That under every dispensation of religion the pious and virtuous man shall, during the whole of his existence, enjoy more happiness than misery; and that the incorrigibly wicked, if there be any such, shall have a greater portion of misery than happiness, are truths which cannot be controverted by any one who admits, that the Almighty governor of the universe is a Being of wisdom, goodness, and justice. But respecting the rewards of virtue and the punishment of vice, more than these general truths seems not to be taught by natural religion. Many divines, however, of great learning and worth, have thought otherwise, and have contended, that from the nature of things the rewards bestowed by an infinite God upon piety and virtue must be eternal like their author. These men indeed appear willing enough to allow that the punishments with which natural religion is armed against vice must be only of a temporary duration, because reason, say they, is ready to revolt at the thought of everlasting punishment.

93
Did not,
when per-
formed, en-
title him
to eternal
life.

This opinion, which confounds natural with revealed religion, giving to the former an important truth which belongs exclusively

(κ) The woman was some time afterwards distinguished by the name of Eve mn, because she was to be the mother of all living, and particularly of that blessed seed which was to bruise the head of the serpent. See Parkhurst's Lexicon on the word.

Original
state of
man.Original
state of
man.

exclusively to the latter, has been so ably confuted by a learned writer, who was never averse from allowing to human reason all the discoveries which it can justly claim, that we shall submit his arguments to our readers in preference to any thing which we can give ourselves.

94
Argu-
ments to
prove that
they did
inconclu-
sive.

"If reason doth, on the one hand, seem to revolt at *everlasting punishment*, we must confess that *FANCY*, on the other, (even when full plumed by *vanity*), hath scarce force enough to rise to the idea of *infinite rewards*. How the heart of man came to consider this as no more than an adequate retribution for his right conduct during the short trial of his virtue here, would be hard to tell, did we not know what monsters *PRIDE* begot of old upon *Pagan philosophy*; and how much greater still these latter ages have disclosed, *by the long incubation of school-divinity upon folly*. What hath been urged from natural reason, in support of this extravagant presumption, is so very slender, that it recoils as you enforce it. First, you say, 'that the soul, the subject of these eternal rewards, being *immaterial*, and so therefore unaffected by the causes which bring material things to an end, is, by its nature, fitted for eternal rewards.—This is an argument *ad ignorantiam*, and holds no farther.—Because an *immaterial* being is not subject to that mode of dissolution which affects *material* substances, you conclude it to be eternal. This is going too fast. There may be, and probably are, many natural causes (unknown indeed to us), whereby immaterial beings come to an end. But if the nature of things cannot, yet God certainly can, put a final period to such a being when it hath served the purpose of its creation. Doth *ANNIHILATION* impeach that wisdom and goodness which was displayed when God brought it *out of nothing*? Other immaterial beings there are, *viz.* the souls of brutes, which have the same natural security with man for their existence, of whose *eternity* we never dream. But pride, as the poet observes, *calls God unjust*.

If man alone engross not heaven's high care;
Alone made *perfect* here, *IMMORTAL* there.

However, let us (for argument's sake) allow the human soul to be unperishable by nature, and secured in its existence by the unchangeable will of God, and see what will follow from thence—An *infinite* reward for virtue, during one moment of its existence, because reason discovers that, by the law of nature, *some* reward is due? By no means. When God hath amply repaid us for the performance of our duty, will he be at a loss how to dispose of us for the long remainder of *eternity*? May he not find new and endless employment for reasonable creatures, to which, when properly discharged, new rewards and in endless succession will be assigned? Modest reason seems to dictate this to the followers of the *law of nature*. The flattering expedient of *ETERNAL REWARDS* for virtue here was invented in the simplicity of early speculation, after it had fairly brought men to conclude that the soul is immaterial.

"Another argument urged for the eternity of the rewards held out by natural religion to the practice of piety and virtue is partly physical and partly moral. The merit of service (say the admirers of that religion) increases in proportion to the excellence of that Being to whom our service is directed and becomes acceptable. An infinite being, therefore, can dispense no rewards but what are infinite. And thus the virtuous man becomes intitled to immortality.

"The misfortune is, that this reasoning holds equally on the side of the unmerciful doctors, as they are called, who doom the wicked to *EVERLASTING PUNISHMENT*. Indeed were this the only discredit under which it labours, the merciless doctors would hold themselves little concerned. But the truth is, that the argument from *infinity* proves

just nothing. To make it of any force, both the parties should be *infinite*. This inferior emanation of God's image, *MAN*, should either be supremely good or supremely bad, a kind of deity or a kind of devil. But these reasoners, in their attention to the *divinity*, overlook the *humanity* which makes the decrease keep pace with the accumulation, till the rule of logic, that the *conclusion follows the weaker part*, comes in to end the dispute †.

These arguments seem to prove unanswerably that immortality is not essential to any part of the compound being man, and that it cannot be claimed as a reward due to his virtue. It is not indeed essential to any created being, for what has not existence of itself, cannot of itself have perpetuity of existence (see *METAPHYSICS*, n^o 272, &c.); and as neither man nor angel can be profitable to God, they cannot claim from him any thing as a debt. Both, indeed, as moral agents have duties prescribed them; and while they faithfully perform these duties, they have all the security which can arise from the perfect benevolence of him who brought them into existence, that they shall enjoy a sufficient portion of happiness to make that existence preferable to non-existence; but reason and philosophy furnish no data from which it can be inferred that they shall exist for ever. Man is composed in part of perishable materials. However perfect Adam may be thought to have been when he came first from the hands of his Creator, his body, as formed of the dust of the ground, must have been naturally liable to decay and dissolution. His soul, indeed, was of a more durable substance; but as it was formed to animate his body, and had no prior conscious existence, it is not easy to conceive what should have led him, under an equal providence, where rewards and punishments were exactly distributed, to suppose that one part of him should survive the other. In his natural and original state, before the covenant made with him in paradise, he was unquestionably a mortal creature. How long he continued in that state, it seems not possible to form a plausible conjecture. Bishop Warburton supposes him to have lived several years under no other dispensation than that of natural religion; during which he was as liable to death as his fallen posterity are at present.

"We must needs conclude (says this learned writer *), that God having tried Adam in the *state of nature*, and approved of the good use he made of his free-will under the direction of that light, advanced him to a superior station in *Paradise*. How long, before this remove, man had continued subject to *natural religion* alone, we can only guess: but of this we may be assured, that it was some considerable time before the garden of Eden could naturally be made fit for his reception. Since Moses, when he had concluded his history of the creation, and of God's rest on, and *sanctification* of, the seventh day proceeds to speak of the condition of this new world in the following terms: "*And God made every plant of the field before it was in the earth, and every herb of the field before it grew; for the Lord God had not caused it to rain upon the earth †.*" Which seems plainly to intimate, that when the seeds of vegetables had been created on the third day, they were left to nature, in its ordinary operations, to mature by sun and showers. So that when in course of time Paradise was become capable of accommodating its inhabitants, they were transplanted thither."

This reasoning is not without a portion of that ingenuity which was apparent in every thing that fell from the pen of Warburton; but it was completely confuted almost as soon as it was given to the public, and shown to be deduced from premises which could be employed against the author's system. If only the *seeds* of vegetables were created on the third day, and then left to nature, in its ordinary operations,

† Warbur-
ton's Di-
vine Lega-
tion, book
ix.95
Adam be-
fore his in-
troducti-
on into para-
dise liable
to death.* Divine
Legation,
book ix.
chap. i.
96
How long
he continu-
ed in that
state† Gen. ii.
4, 5.

Original
state of
man.* Gen. i.
12.97
Impossible
to be
known.} Gen. ii.
8, 15, 16,
17.

to mature by sun and showers, the first pair must have perished before a single vegetable could be fit to furnish them with food; and we may suppose that it was to prevent this disaster that the garden of Eden was miraculously stored at once with full grown trees and fruit in perfect maturity, whilst the rest of the earth was left under the ordinary laws of vegetation. There is, however, no evidence that they were only the *seeds* of vegetables that God created. On the contrary, Moses says expressly †, that God made the earth on the third day bring forth the herb *yielding seed* after his kind, and the tree *yielding fruit* whose *seed* was in itself after his kind:” and when he recapitulates the history of the creation, he says, that God made, not every seed, but every *plant* of the field *before* it was in the earth, and every *herb* of the field *before* it grew. From the process of vegetation, therefore, nothing can be inferred with respect to the time of Adam’s introduction into Paradise, or to ascertain the duration of his original state of nature. If angels were created during the six days of which the Hebrew lawgiver writes the history, an hypothesis very generally received (see ANGEL), though in the opinion of the present writer not very probable, there can be no doubt but our first parents lived a considerable time under the law of nature before they were raised to a superior station in the garden of Eden; for it seems very evident that the period of their continuance in that station was not long. Of this, however, nothing can be said with certainty. They may have lived for years or only a few days in their original state; but it is very necessary to distinguish between that state in which they were under no other dispensation than what is commonly called *natural religion*, entitled, upon their obedience, to the indefinite rewards of piety and virtue, and their state in Paradise when they were put under a new law, and by the free grace of God promised, if they should be obedient, a supernatural and eternal reward. Into that state we must now attend them, and ascertain, if we can, the precise terms of the first covenant.

Moses, who in this investigation is our only guide, tells us, that the Lord God, after he had formed the first pair, “planted a garden eastward in Eden, and took the man and put him into the garden to dress it and to keep it. And the Lord God (continues he) commanded the man, saying, of every tree of the garden thou mayest freely eat; but of the tree of the knowledge of good and evil thou shalt not eat of it; for in the day that thou eatest thereof, thou shalt surely die †.” Here is no mention made of the laws of piety and moral virtue resulting from the relation in which the various individuals of the human race stand to each other, and in which all as creatures stand to God their Almighty and beneficent Creator. With these laws Adam was already well acquainted; and he must have been sensible, that as they were founded in his nature no subsequent law could dispense with their obligation. They have been equally binding upon all men in every state and under every dispensation; and they will continue to be so as long as the

general practice of justice, mercy, and piety, shall contribute to the sum of human happiness. The new law peculiar to his paradisaical state was the command not to eat of the fruit of the tree of the knowledge of good and evil. This was a positive precept, not founded in the nature of man, but very proper to be the test of his obedience to the will of his Creator. The laws of piety and virtue are sanctioned by nature, or by that general system of rules according to which God governs the physical and moral worlds, and by which he has secured, in some state or other, happiness to the pious and virtuous man, and misery to such as shall prove incorrigibly wicked. The law respecting the forbidden fruit was sanctioned by the penalty of *death* denounced against disobedience; and by the subjects of that law the nature of this penalty must have been perfectly understood: but Christian divines, as we shall afterwards see, have differed widely in opinion respecting the full import of the Hebrew words which our translators have rendered by the phrase *thou shalt surely die*. All, however, agree that they threatened death, in the common acceptation of the word, or the separation of the soul and body as one part of the punishment to be incurred by eating the forbidden fruit; and hence we must infer, that had the forbidden fruit not been eaten, our first parents would never have died, because the penalty of death was denounced against no other transgression. What therefore is said respecting the fruit of the tree of knowledge, implies not only a law but also a covenant (L), promising to man, upon the observance of one positive precept, immortality or eternal life; which is not essential to the nature of any created being, and cannot be claimed as the merited reward of the greatest virtue or the most fervent piety.

This obvious truth will enable us to dispose of the objections which have been sometimes brought by free-thinking divines against the wisdom and justice of punishing so severely as by death the breach of a mere positive precept; which, considered in itself, or as connected with the general principles of moral obligation, appears to be a precept of very little importance. We have only to reply, that as an exemption from death is not due either to the nature or to the virtue of man, it was wise and just to make it depend upon the observance of a positive precept, to impress upon the minds of our first parents a constant conviction that they were to be preserved immortal, not in the ordinary course of divine providence, but by the special grace and favour of God. The same consideration will show us the folly of those men who, because the terms of the first covenant, as stated in some systems of theology, agree not with certain philosophical maxims which they have adopted, are for turning all that is said of the trees of knowledge and of life into figure and allegory. But the other trees which Adam and Eve were permitted to eat were certainly real trees, or they must have perished for want of food. And what rules of interpretation will authorise us to interpret *eating* and *trees* literally in one part of the sentence and figuratively in the other? A garden in

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state of
man.

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The cove-
nant of e-
ternal life
made with
Adam in
paradise.

(L) It does not appear that any transaction between God and mankind in general was denominated by a word equivalent to the English word *covenant* till the end of the fourth century, when such phraseology was introduced into the church by the celebrated Augustine, bishop of Hippo. That the phraseology is strictly proper, no man can suppose who reflects on the infinite distance between the contracting parties, and the absolute dominion of the one over the other. To be capable of entering into a *covenant*, in the proper sense of the word, both parties must have a right either to agree to the terms proposed or to reject them; but surely Adam had no right to bargain with his Maker, or to refuse the gift of immortality on the terms on which it was offered to him. The word *dispensation* would more accurately denote what is here meant by the word *covenant*; but as this last is in general use, we have retained it as sufficient, when thus explained, to distinguish what man received from God upon certain positive conditions, from what he had a claim to by the constitution of his nature.

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state of
man.

in a delightful climate is the very habitation, and the fruits produced in that garden the very food, which we should naturally suppose to have been prepared for the progenitors of the human race; and though in the garden actually fitted up for this purpose two trees were remarkably distinguished from the rest, perhaps in situation and appearance as well as in use, the distinction was calculated to serve the best of purposes. The one called the *tree of life*, of which, while they continued innocent, they were permitted to eat, served as a sacramental pledge or assurance on the part of God, that as long as they should observe the terms of the covenant their life should be preserved; the other, of which it was death to taste, was admirably adapted to impress upon their minds the necessity of implicit obedience to the Divine will, in whatever manner it might be made known to them.

• Bull's
state of
Man before
the fall.99
Had it not
been viola-
ted, enti-
tled him to
heaven,

A question has been started, and it is of some importance, What would have finally become of men if the first covenant had not been violated? That they would have been all immortal is certain; but it is by no means certain that they would have lived for ever upon this earth. On the contrary, it has been an article of very general belief in all ages of the church*, that the garden of Eden was an emblem or type of heaven, and therefore called *Paradise* (see PARADISE); and that under the first covenant, mankind, after a sufficient probation here, were to be translated into heaven without tasting death. This doctrine is not indeed explicitly taught in scripture; but many things conspire to make it highly probable. The frequent communications between God and man before the fall (M), seem to indicate that Adam was training up for some higher state than the terrestrial paradise. Had he been intended for nothing but to cultivate the ground and propagate his species, he might have been left like other animals to the guidance of his own reason and instincts; which, after the rudiments of knowledge were communicated to him, must surely have been sufficient to direct him to every thing necessary to the comforts of a life merely sensual and rational, otherwise he would have been an imperfect animal. It is obvious too, that this earth, however fertile it may have originally been, could not have afforded the means of subsistence to a race of immortal beings multiplying to infinity. For these reasons, and others which will readily occur to the reader, it seems incontrovertible, that, under the first covenant, either mankind would have been successively translated to some superior state, or would have ceased to propagate their kind as soon as the earth should have been replenished with inhabitants. He who reflects on the promise, that, after the general resurrection, there is to be a new heaven and a new earth, will probably embrace the latter part of the alternative; but that part in its consequences differs not from the former. In the new earth promised in the Christian revelation, nothing is to dwell but righteousness. It will therefore be precisely the same with what we conceive to be expressed by the word heaven; and if under the first covenant this earth was to be converted into a similar place, where, after a certain period, men should neither marry nor be given in marriage, but enjoy what divines have called the *beatific vision*, we may confidently affirm, that, had the first covenant been faithfully observed, Adam and his posterity, after a sufficient probation, would all have been translated to some superior state or heaven.

100
And the
gifts of
divine
grace.

To fit them for that state, the gifts of divine grace seem to have been absolutely necessary. To them it was a state

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state of
man.

certainly supernatural, otherwise a God of infinite wisdom and perfect goodness would not, for a moment, have placed them in an inferior state. But to enable any creature, especially such a creature as man, whom an ancient philosopher has justly styled *ζωον μισκλιον*, to rise above its nature, foreign and divine aid is unquestionably requisite: and therefore, though we cannot persuade ourselves that the gifts of the Holy Ghost constituted that image of God in which man was originally made, we agree with bishop Bull, that these gifts were bestowed upon our first parents to enable them to fulfil the terms of the covenant under which they were placed.

Upon the whole, we think it apparent from the portions of scripture which we have examined, that Adam and Eve were endued with such powers of body and mind as fitted them to exercise dominion over the other animals; that those powers constituted that image of God in which they are said to have been formed; that they received by immediate revelation the first principles of all useful knowledge, and especially of that system which is usually called *natural religion*; that they lived for some time with no other religion, entitled to the natural rewards of piety and virtue, but all the while liable to death; that they were afterwards translated into paradise, where they were placed under a new law, with the penalty of death threatened to the breach of it, and the promise of endless life if they should faithfully observe it; and that they were endued with the gifts of the Holy Ghost, to enable them, if not wanting to themselves, to fulfil the terms of that covenant, which has been improperly termed the *covenant of works*, since it flowed from the mere grace of God, and conferred privileges on man to which the most perfect human virtue could lay no just claim.

101
It is there-
fore impro-
perly called
the covenant
of works,SECT. III. *Of the Fall of Adam, and its Consequences.*

FROM the preceding account of the primeval state of man, it is evident that his continuance in the terrestrial paradise, together with all the privileges which he there enjoyed, were made to depend upon his observance of one positive precept. Every other duty incumbent on him, whether as resulting from what is called the law of his nature, or from the express command of his God, was as much his duty before as after he was introduced into the garden of Eden; and though the transgression of any law would undoubtedly have been punished, or have been forgiven only in consequence of sincere repentance and amendment, it does not appear that a breach of the *moral law*, or of the commandment respecting the sanctification of the *Sabbath-day*, would have been punished with death, whatever may be the import of that word in the place where it is first threatened. The punishment was denounced only against eating the fruit of the tree of the knowledge of good and evil: For "the Lord God commanded the man, saying, of every tree of the garden thou mayest freely eat, but of the tree of the knowledge of good and evil thou shalt not eat of it; for in the day that thou eatest thereof thou shalt surely die." To the word *death* in this passage divines have affixed many and different meanings. By some it is supposed to import a separation of the soul and body, while the latter was to continue in a state of conscious existence; by others, it is taken to imply annihilation or a state without consciousness; by some, it is imagined to signify eternal life in torments; and by others a spiritual and moral death, or a state necessarily subject to sin.

102
As it could
be violated
only by
disobedi-
ence to one
positive
command.

In

(M) That there were such frequent communications, has been shown to be in the highest degree probable by the late Dr Law bishop of Carlisle. See his *Discourse on the several Dispensations of revealed Religion*.

Fall of A-
dam, and
its conse-
quences.

103
It was vic-
laced,

In any one of these acceptations it denoted something new to Adam, which he could not understand without an explanation of the term; and therefore, as it was threatened as the punishment of only one transgression, it could not be the divine intention to inflict it upon any other.

The abstaining from a particular fruit in the midst of a garden abounding with fruits of all kinds, was a precept which at first view appears of easy observation; and the penalty threatened against the breach of it was, in every sense, awful. The precept, however, was broken notwithstanding that penalty; and though we may thence infer that our first parents were not beings of such absolute perfection as by system-building divines they have sometimes been represented, we shall yet find, upon due consideration, that the temptation by which they were seduced, when taken with all its circumstances, was such as no wise and modest man will think himself able to have resisted. The short history of this important transaction, as we have it in the third chapter of the book of Genesis, is as follows.

"Now the serpent was more subtle than any beast of the field which the Lord God had made; and he said unto the woman, Yea, hath God said, ye shall not eat of every tree of the garden? And the woman said unto the serpent, We may eat of the fruit of the trees of the garden; but of the fruit of the tree which is in the midst of the garden, God hath said ye shall not eat of it, neither shall ye touch it, lest ye die. And the serpent said unto the woman, ye shall not surely die: For God doth know, that on the day ye eat thereof, then your eyes shall be opened, and ye shall be as gods, knowing good and evil. And when the woman saw that the tree was good for food, and that it was pleasant to the eyes, and a tree to be desired to make one wise, she took of the fruit thereof, and did eat, and gave also unto her husband with her, and he did eat."

104
In conse-
quence of
a most art-
ful temp-
tation,

To the less attentive reader this conversation between the serpent and the woman must appear to begin abruptly; and indeed it is not possible to reconcile it with the natural order of a dialogue, or even with the common rules of grammar, but by supposing the tempter's question, "Yea, hath God said, ye shall not eat of every tree of the garden?" to have been suggested by something immediately preceding either in words or in significant signs. Eve had undoubtedly by some means or other informed the serpent that she was forbidden to eat of the fruit upon which he was probably feasting; and that information, whether given in words or in actions, must have produced the question with which the sacred historian begins his relation of this fatal dialogue. We are told that the woman saw that the tree was good for food; that it was pleasant to the eyes, and a tree to be desired to make one wise; but all this she could not have seen, had not the serpent eaten of its fruit in her presence. In her walks through the garden, it might have often appeared pleasant to her eyes; but previous to experience she could not know but that its fruit was the most deadly poison, far less could she conceive it capable of conferring wisdom. But if the serpent eat of it before her, and then extolled its virtues in rapturous and intelligible language, she would at once see that it was not destructive of animal life, and naturally infer that it had very singular qualities. At the moment she was drawing this inference, it is probable that he invited her to partake of the delicious fruit, and that her

refusal produced the conference before us. That she yielded to his temptation need excite no wonder; for she knew that the serpent was by nature a mute animal, and if he attributed his speech to the virtues of the tree, she might infer, with some plausibility, that what had power to raise the brute mind to human, might raise the human to divine, and make her and her husband, according to the promise of the tempter, become as gods, knowing good and evil. Milton, who was an eminent divine as well as the prince of poets, makes her reason thus with herself.

Great are thy virtues, doubtless, best of fruits,
Tho' kept from man, and worthy to be admir'd;
Whose taste, too long forbore, at first essay
Gave elocution to the mute, and taught
The tongue not made for speech to speak thy praise.

* * * * * For us alone

Was death invented? or to us denied
This intellectual food, for beasts reserved?
For beasts it seems: yet that one beast which first
Hath tasted, envies not, but brings with joy
The good befallen him, author unsuspect,
Friendly to man, far from deceit or guile.
What fear I then, rather what know to fear
Under this ignorance of good and evil,
Of God or death, of law or penalty?
Here grows the cure of all, this fruit divine,
Fair to the eye, inviting to the taste,
Of virtue to make wise: what hinders then
To reach, and feed at once both body and mind?

Paradise Lost, book ix.

Full of these hopes of raising herself to divinity, and not, as has sometimes been supposed, led headlong by a sensual appetite, she took of the fruit and did eat, and gave to her husband with her, and he did eat. The great poet makes Adam delude himself with the same sophistry that had deluded Eve, and infer, that as the serpent had attained the language and reasoning powers of man, they should attain

Proportional ascent, which could not be
But to be gods, or angels, demi-gods.

Thus was the covenant, which, on the introduction of our first parents into paradise, their Creator was graciously pleased to make with them, broken by their violation of the condition on which they were advanced to that supernatural state; and therefore the historian tells us, that "lest they should put forth their hand and take also of the tree of life and eat, and live for ever, the Lord God sent them forth from the garden of Eden to till the ground from whence they were taken (N)." Had they been so sent forth without any farther intimation respecting their present condition or their future prospects, and if the death under which they had fallen was only a loss of consciousness, they would have been in precisely the same state in which they lived before they were placed in the garden of Eden; only their minds must now have been burdened with the inward sense of guilt, and they must have known themselves to be subject to death; of which, though not exempted from it by nature, they had probably no apprehension till it was revealed to them in the covenant of life which they had so wantonly broken.

God, however, did not send them forth thus hopeless and forlorn from the paradise of delights which they had so recently

105
And Adam
and Eve
turned out
of paradise.

(N) The ideas which this language conveys are indeed *allegorical*; but they inform us of this, and nothing but this, that *immortal life was a thing extraneous to our nature*, and not put into our paste or composition when first fashioned by the forming hand of the Creator." *Warburton's Divine Legation*, Book ix. Chap. 1.

cently forfeited. He determined to punish them for their transgression, and at the same time to give them an opportunity of recovering more than their lost inheritance. Calling therefore the various offenders before him, and inquiring into their different degrees of guilt, he began with pronouncing judgment on the serpent in terms which implied that there was mercy for man. "And the Lord God said unto the serpent, Because thou hast done this, thou art cursed above all cattle, and above every beast of the field: upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life; and I will put enmity between thee and the woman, and between thy seed and her seed: it shall bruise thy head, and thou shalt bruise his heel."

106 The tempter punished.
 That this sentence has been fully inflicted on the serpent, no reasoning can be necessary to evince. Every species of that reptile is more hateful to man than any other terrestrial creature; and there is literally a perpetual war between them and the human race. It is remarkable too that the head of this animal is the only part which it is safe to bruise. His tail may be bruised, or even cut off, and he will turn with fury and death on his adversary: but the slightest stroke on the head infallibly kills him. That the serpent, or at least the greater part of serpents, go on their belly, every one knows; though it is said*, that in some parts of the east serpents have been seen with wings, and others with feet, and that these species are highly beautiful. If there be any truth in this story, we may suppose that these walking and flying serpents have been suffered to retain their original elegance, that mankind might see what the whole genus was before the curse was denounced on the tempter of Eve: but it is certain that most of the species have neither wings nor feet, and that many of the most poisonous of them live in burning deserts, where they have nothing to eat but the dust among which they crawl ||.

* See Bochart and Pline on Serpents, with Bruce's Travels.
 To this degradation of the serpent, infidels have objected, that it implies the punishment of an animal which was incapable of guilt; but this objection is founded in thoughtlessness and ignorance. The elegant form of any species of inferior animals adds nothing to the happiness of the animals themselves: the ass is probably as happy as the horse, and the serpent that crawls as he that flies. Fine proportions attract indeed the notice of man, and tend to impress upon his mind just notions of the wisdom and goodness of the Creator; but surely the symmetry of the horse or the beauty of the peacock is more properly displayed for this purpose than the elegance of the instrument employed by the enemy of mankind. The degradation of the serpent in the presence of our first parents must have served the best of purposes. If they had so little reflection as not yet to have discovered that he was only the instrument with which a more powerful Being had wrought their ruin, they would be convinced, by the execution of this sentence, that the forbidden fruit had no power in itself to improve the nature either of man or of beast. But it is impossible that they could be so stupid as this objection supposes them. They doubtless knew by this time that some great and wicked spirit had actuated the organs of the serpent; and that when enmity was promised to be put between its seed and the seed of the woman, that promise was not meant to be fulfilled by serpents occasionally biting the heels of men, and by men in return bruising the heads of serpents! If such enmity, though it has literally taken place, was all that was meant by this prediction, why was not Adam directed to bruise the head of the identical serpent which had seduced his wife? If he could derive any consolation from the exercise of revenge, surely it would be greater from his revenging himself on his own enemy, than from the knowledge that there should be

a perpetual warfare between his descendants and the breed of serpents through all generations.

We are told, that when the foundations of the earth were laid, the morning stars sang together, and all the sons of God shouted for joy; and it is at least probable that there would be similar rejoicing when the six days work of creation was finished. If so, Adam and Eve, who were but a little lower than the angels, might be admitted into the chorus, and thus be made acquainted with the existence of good and evil spirits. At all events, we cannot doubt but their gracious and merciful Creator would inform them that they had a powerful enemy;—that he was a rebellious angel capable of deceiving them in many ways; and that they ought therefore to be constantly on their guard against his wiles. They must have known too that they were themselves animated by something different from matter; and when they found they were deceived by the serpent, they might surely, without any remarkable stretch of sagacity, infer that their malignant enemy had actuated the organs of that creature in a manner somewhat similar to that in which their own souls actuated their own bodies. If this be admitted, the degradation of the serpent would convince them of the weakness of the tempter when compared with their Creator; and confirm their hopes, that since he was not able to preserve unhurt his own instrument of mischief, he should not be able finally to prevail against them; but that though he had bruised their heels, the promised seed of the woman should at last bruise his head, and recover the inheritance which they had lost. See PROPHECY, n° 9, 10.

107 Sentence passed on Adam and Eve.
 Having thus punished the original instigator to evil, the Almighty Judge turned to the fallen pair, and said to the woman, "I will greatly multiply thy sorrow and thy conception: in sorrow shalt thou bring forth children; and thy desire shall be to thy husband, and he shall rule over thee. And unto Adam he said, Because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree of which I commanded thee, saying, Thou shalt not eat of it; cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life. Thorns also and thistles shall it bring forth unto thee, and thou shalt eat the herb of the field. In the sweat of thy face shalt thou eat bread till thou return unto the ground; for out of it wast thou taken: for dust thou art, and unto dust shalt thou return."

Here is a terrible denunciation of toil and misery and death upon two creatures; who, being injured to nothing, and formed for nothing but happiness, must have felt infinitely more horror from such a sentence, than we, who are familiar with death, intimate with misery, and "born to sorrow as the sparks fly upward," can form any adequate conception of. The hardship of it, too, seems to be aggravated by its being severer than what was originally threatened against the breach of the covenant of life. It was indeed said, "In the day thou eatest thereof, thou shalt surely die:" but no mention was made of the woman's incurring sorrow in conception, and in the bringing forth of children; of the curse to be inflicted on the ground; of its bringing forth thorns and thistles instead of food for the use of man; and of Adam's eating bread in sorrow and the sweat of his face till he should return to the dust from which he was taken.

108 An obscure intimation given them of deliverance from it.
 These seeming aggravations, however, are in reality instances of divine benevolence. Adam and Eve were now subjected to death; but in the sentence passed on the serpent, an obscure intimation had been given them that they were not to remain for ever under its power. It was therefore their interest, as well as their duty, to reconcile themselves as much as possible to their fate; to wean their affections from this world, in which they were to live only for a time;

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time; and to hope, with humble confidence, in the promise of their God, that, upon their departure from it, they should be received into some better state. To enable them to wean their affections from earth, nothing could more contribute than to combine sensual enjoyment with sorrow, and lay them under the necessity of procuring their means of subsistence by labour, hard and often fruitless. This would daily and hourly impress upon their minds a full conviction that the present world is not a place fit to be an everlasting habitation; and they would look forward, with pious resignation, to death, as putting a period to all their woes. Had they indeed been furnished with no ground of hope beyond the grave, we cannot believe that the Righteous Judge of all the earth would have added to the penalty originally threatened. That penalty they would doubtless have incurred the very day on which they fell; but as they were promised a deliverance from the consequences of their fall, it was proper to train them up by severe discipline for the happiness reserved for them in a future state.

After the passing of their sentence, the man and woman were turned out into the world, where they had formerly lived before they were placed in the garden of Eden; and all future access to the garden was for ever denied them. They were not, however, in the same state in which they were originally before their introduction into Paradise: They were now conscious of guilt; doomed to severe labour; liable to sorrow and sickness, disease and death: and all these miseries they had brought, not only upon themselves, but also, as we learn from different passages of the New Testament, upon their unborn posterity to the end of time. It may seem indeed to militate against the moral attributes of God, to inflict misery upon children for the sins of their parents; but before any thing can be pronounced concerning the Divine goodness and justice in the present case, we must know precisely how much we suffer in consequence of Adam's transgression, and whether we have ourselves any share in that guilt which is the cause of our sufferings.

109
Doubtful
whether
men would
have been
exempted
from pain
under the
first cove-
nant,

That women would have had less sorrow in conception and in the bringing forth of children; that we should have been subjected to less toil and exempted from death, had our first parents not fallen from their paradisaical state—are truths incontrovertible by him who believes the inspiration of the Holy Scriptures; but that mankind would in that state have been wholly free from pain and every bodily distress, is a proposition which is not to be found in the Bible, and which therefore no man is bound to believe. The bodies of Adam and Eve consisted of flesh, blood, and bones, as ours do; they were surrounded by material objects as we are; and their limbs were unquestionably capable of being fractured. That their souls should never be separated from their bodies while they abstained from the forbidden fruit, they knew from the infallible promise of him who formed them, and breathed into their nostrils the breath of life; but that not a bone of themselves or of their numerous posterity should ever be broken by the fall of a stone or of a tree, they were not told, and had no reason to expect. Of such fractures, pain would surely have been the consequence; though we have reason to believe that it would have been quickly removed by some infallible remedy, probably by the fruit of the tree of life.

Perhaps it may be said, that if we suppose our first parents or their children to have been liable to accidents of this kind in the garden of Eden, it will be difficult to conceive how they could have been preserved from death, as a stone might have fallen on their heads as well as on their feet, and have at once destroyed the principle of vitality. But this can be said only by him who knows little of the physical world, and still less of the power of God. There

are many animals which are susceptible of pain, and yet not easily killed; and man in paradise might have resembled these. At any rate, we are sure that the Omnipotent Creator could and would have preserved him from death; but we have no reason to believe that, by a constant miracle, he would have preserved him from every kind of pain. Indeed, if, under the first covenant, mankind were in a state of probation, it is certainly conceivable that some one individual of the numerous race might have fallen into sin, without actually breaking the covenant by eating the fruit of the tree of knowledge; and such a sinner would undoubtedly have been punished by that God who is of purer eyes than to behold iniquity: but how punishment could have been inflicted on a being exempted from all possibility of pain as well as of death, we confess ourselves unable to imagine. Remorse, which is the inseparable consequence of guilt, and constitutes in our present state great part of its punishment, flows from the fearful looking for of judgment, which the sinner knows shall, in a future state, devour the adversaries of the gospel of Christ; but he, who could neither suffer pain nor death, had no cause to be afraid of future judgment, and was therefore not liable to the tortures of remorse. We conclude, therefore, that it is a mistake to suppose pain to have been introduced into the world by the fall of our first parents, or at least that the opinion contrary to ours has no foundation in the word of God.

Death, however, was certainly introduced by their fall; Though for the inspired apostle assures us, that in *Adam all die* *; they would and again, that *through the offence of ONE many are dead* †. * 1 Cor. from death. But concerning the full import of the word *death* in this place, and in the sentence pronounced upon our first parents, † Rom. divines hold opinions extremely different. Many contend, v. 15. that it includes death *corporal, spiritual, or moral and eternal*; and that all mankind are subjected to these three kinds of death, on account of their share in the guilt of the original transgression, which is usually denominated *original sin*, and considered as the source of all moral evil.

That all men are subjected to death corporal in consequence of Adam's transgression, is universally admitted; but that they are in any sense partakers of his guilt, and on that account subjected to death spiritual and eternal, has been very strenuously denied. To discover the truth is of great importance; for it is intimately connected with the Christian doctrine of redemption. We shall therefore state, with as much impartiality as we can, the arguments commonly urged on each side of this much agitated question: but should the reader perceive, as very probably he may, that we lean more to the one side than to the other, he will do well to shut our book, and, disregarding all artificial systems, study, with an unbiassed mind, the writings only of the prophets and apostles.

Those who maintain that all men sinned in Adam, gene-Doctrines of rally state their doctrine thus: "The covenant being made original sin with Adam as a public person, not for himself only but stated. for his posterity, all mankind descending from him by ordinary generation *sinned* in him and fell with him in that first transgression; whereby they are deprived of that original righteousness in which he was created, and are utterly indisposed, disabled, and made opposite to all that is spiritually good, and wholly inclined to all evil, and that continually; which is commonly called *original sin*, and from which do proceed all actual transgressions, so as we are by nature children of wrath, bond-slaves to Satan, and justly liable to all punishments in this world and in that which is to come, even to everlasting separation from the comfortable presence of God, and to most grievous torments in soul and body, without intermission, in hell-fire for ever."

That which in this passage we are first to examine, is the sentence

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dam, and
its conse-
quences.

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its conse-
quences.

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Arguments
for it.

† Rom. v.
12, 15—20.

* Rom. iii.
10. and
Eph. ii. 1.
and 3.

† Job xiv.
4. and xv.
14.

§ Psalm li.
5.

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Adam's
guilt impu-
ted to his
posterity.

sentence which affirms all mankind descending from Adam by ordinary generation to have *sinned* in him and fallen with him in his first transgression; the truth of which is attempted to be proved by various texts of Holy Scripture.

Thus St Paul says expressly, that "by one man sin entered into the world, and death by sin; and so death passed upon all men, for that *all have sinned*." But not as the offence, so also is the free gift. For if, through the *offence of one*, many be dead; much more the grace of God, and the gift by grace, which is by one man, Jesus Christ, hath abounded unto many; and not as it was by one that sinned, so is the gift (for the *judgment* was by one unto *condemnation*); but the free gift is of many offences unto justification. For if, by one man's offence, death reigned by one; much more they, who receive the abundance of grace and of the gift of righteousness, shall reign in life by one, Jesus Christ. Therefore as, by the *offence of one*, judgment came upon *all men to condemnation*; even so, by the righteousness of One, the free gift came upon all men unto justification of life. For as by one man's disobedience many were made sinners; so by the obedience of one shall many be made righteous†.

In this passage the apostle assures us, that all upon whom death hath passed have *sinned*; but death hath passed upon infants, who could not commit actual sin. Infants therefore must have sinned in Adam, since death hath passed upon them; for death "is the wages only of sin." He tells us likewise, that by the offence of one, judgment came upon all men to condemnation; and therefore, since the Righteous Judge of heaven and earth never condemns the innocent with the wicked, we must conclude, that all men partake of the guilt of that offence for which judgment came upon them to condemnation. These conclusions are confirmed by his saying expressly, that "by one man's disobedience many (*i. e.* all mankind) were made sinners;" and elsewhere*, that "there is none righteous, no not one;" and that his Ephesian converts "were dead in trespasses and sins, and were by nature children of wrath even as others." The same doctrine, it is said, we are taught by the inspired writers of the Old Testament. Thus Job, expostulating with God for bringing into judgment with him such a creature as man, says, "Who can bring a clean thing out of an unclean? Not one." And Eliphaz, reproving the patient patriarch for what he deemed presumption, asks ‡, "What is man that he should be clean, or he who is born of a woman that he should be righteous?" From these two passages it is plain, that Job and his unfeeling friend, though they agreed in little else, admitted as a truth unquestionable, that man inherits from his parents a sinful nature, and that it is impossible for any thing born of a woman by ordinary generation to be righteous. The Psalmist talks the very same language; when acknowledging his transgressions, he says §, "Behold I was shapen in iniquity, and in sin did my mother conceive me."

Having thus proved the fact, that all men are made sinners by Adam's disobedience, the divines, who embrace this side of the question, proceed to inquire how they can be partakers in guilt which was incurred so many ages before they were born. It cannot be by imitation; for infants, according to them, are involved in this guilt before they be capable of imitating any thing. Neither do they admit that sin is by the apostle put for the consequences of sin, and many said to be made sinners by one man's disobedience, because by that disobedience they were subjected to death, which is the wages of sin. This, which they call the doctrine of the Arminians, they affirm to be contrary to the whole scope and design of the context; as it confounds together sin and death, which are there represented, the one as the cause, and the other as the effect. It like-

wise exhibits the apostle reasoning in such a manner as would, in their opinion, disgrace any man of common sense, and much more an inspired writer; for then the sense of these words, "Death hath passed upon all men, for that all have sinned," must be, death hath passed upon all men, because it hath passed upon all men; or, all men are obnoxious to death, because they are obnoxious to it. The only way therefore, continue they, in which Adam's posterity can be made sinners through his disobedience, is by the *IMPUTATION* of his disobedience to them; and this imputation is not to be considered in a *moral* sense, as the action of a man committed by himself, whether good or bad, is reckoned unto him as his own; but in a *forensic* sense, as when one man's debts are in a legal way placed to the account of another. Of this we have an instance in the apostle Paul, who said to Philemon concerning Onesimus, "If he hath wronged thee, or oweth thee any thing (*ελλογει*), let it be imputed to me," or placed to and put on my account. And thus the posterity of Adam are made sinners by his disobedience; that being imputed to them and put to their account, as if it had been committed by them personally, though it was not.

Some few divines of this school are indeed of opinion, that the phrase, "By one man's disobedience many were made sinners," means nothing more than that the posterity of Adam, through his sin, derive from him a corrupt nature. But though this be admitted as an undoubted truth, the more zealous abettors of the system contend, that it is not the whole truth. "It is true (say they) that all men are made of one man's blood, and that blood tainted with sin; and so a clean thing cannot be brought out of an unclean. What is born of the flesh is flesh, carnal and corrupt: every man is conceived in sin and shapen in iniquity; but then there is a difference between being *made sinners* and *becoming* sinful. The one respects the *guilt*, the other the *pollution* of nature; the one is previous to the other, and the foundation of it. Men receive a corrupt nature from their immediate parents; but they are made sinners, not by any act of their disobedience, but only by the imputation of the sin of Adam."

To confirm and illustrate this doctrine of imputed sin, they observe, that the word *κατεστησαν*, used by the apostle, signifies *constituted* in a judicial way, ordered and appointed in the dispensation of things that so it should be; just as Christ was made sin or a sinner by imputation, or by that constitution of God which laid upon him the sins of all his people, and dealt with him as if he had been the guilty person. That this is the sense of the passage, they argue further from the punishment inflicted on men for the sin of Adam. The punishment threatened to that sin was death; which includes death corporal, moral, and eternal. Corporal death, say they, is allowed by all to be suffered on account of the sin of Adam; and if so, there must be guilt, and that guilt made over to the sufferer, which can be done only by *imputation*. A moral death is no other than the loss of the image of God in man, which consisted in righteousness and holiness; and particularly it is the loss of original righteousness, to which succeeded unrighteousness and unholiness. It is both a sin and a punishment for sin; and since it comes upon all men as a punishment, it must suppose preceding sin, which can be nothing but Adam's disobedience; the guilt of which is made over to his posterity by *imputation*. This appears still more evident from the posterity of Adam being made liable to eternal death in consequence of his transgression; for the wages of sin, we are assured, is death, even death eternal, which never can be inflicted on guiltless persons. But from the passage before us we learn, that "by the offence of one judgment came upon all

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The punish-
ment of sin-
ners is im-
puted guilt.

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quences.

all men to condemnation;" and therefore the guilt of that offence must be reckoned to all men, or they could not be justly condemned for it. That Adam's sin is imputed to his posterity, appears not only from the words, "by one man's disobedience many were made sinners;" but likewise from the opposite clause, "so by the obedience of One shall many be made righteous;" for the many ordained to eternal life, for whom Christ died, are made righteous, or justified, only through the imputation of his righteousness to them; and therefore it follows, that all men are made sinners only through the imputation of Adam's disobedience.

To this doctrine it is said to be no objection that Adam's posterity were not in being when his sin was committed; for though they had not then actual being, they had yet a virtual and representative one. They were in him both *seminally* and *federally*, and sinned in him*; just as Levi was in the loins of Abraham, and paid in him tithes to Melchizedeck†. From Adam, as their common parent, they derive a corrupt nature; but it is only from him, as their federal head, that they derive a share of his guilt, and are subjected to his punishment. That he was a federal head to all his posterity, the divines of this school think evident from his being called a figure of Christ‡; and the first Adam described as natural and earthly, in contradistinction to Christ the second Adam described as spiritual and the Lord from heaven; and from the punishment threatened against his sin being inflicted not on himself only, but on all his succeeding offspring. He could not be a figure of Christ, say they, merely as a man; for all the sons of Adam have been men as well as he, and in that sense were as much figures of Christ as he; yet Adam and Christ are constantly contrasted, as though they had been the only two men that ever existed, because they were the only two heads of their respective offspring. He could not be a figure of Christ on account of his extraordinary production; for though both were produced in ways uncommon, yet each was brought into the world in a way peculiar to himself. The first Adam was formed of the dust of the ground; the second, though not begotten by a man, was born of a woman. They did not therefore resemble each other in the manner of their formation, but in their office as covenant-heads; and in that alone the comparison between them is exact.

Nor have any of the posterity of Adam, it is said, reason to complain of such a procedure. Had he stood in his integrity, they would have been, by his standing, partakers of all his happiness; and therefore should not murmur at receiving evil through his fall. If this do not satisfy, let it be considered, that since God, in his infinite wisdom, thought proper that men should have a head and representative, in whose hands their good and happiness should be placed, none could be so fit for this high station as the common parent, made after the image of God, so wise, so holy, just, and good. Lastly, to silence all objections, let it be remembered, that what God gave to Adam as a federal head, relating to himself and his posterity, he gave as the Sovereign of the universe, to whom no created being has a

* See Gill's right to ask, "What dost thou?"

Body of Di-
vinity.

Such are the consequences of Adam's fall, and such the doctrine of original sin, as maintained by the more rigid followers of Calvin. That great reformer, however, was not the author of this doctrine. It had been taught, so early as in the beginning of the fifth century, by St Augustine, the celebrated bishop of Hippo (see AUGUSTINE); and the authority of that father had made it more or less prevalent in both the Greek and Roman churches long before the Reformation. Calvin was indeed the most eminent modern divine by whom it has been held in all its rigour;

and it constitutes one great part of that theological system which, from being taught by him, is now known by the name of *Calvinism*. Those by whom it is embraced maintain it with zeal, as, in their opinion, forming, together with the other tenets of their master, the only pure system of evangelical truths; but it hath met with much opposition in some of the Lutheran churches, as well as from private divines in the church of England, and from the great body of Dutch remonstrants (see CALVINISM, ARMINIANS, and SYNOD OF DORT); and of their objections it is now our duty to give a candid view, as well as of the doctrine which they substitute in its stead.

They begin then with alleging, that if it was as sovereign reign of the universe that God gave to Adam what he received in paradise relating to himself and his posterity, Adam could in no sense of the words be a federal head; because, upon this supposition, there was no covenant. The Sovereign of the Universe may unquestionably dispense his benefits, or withhold them, as seems expedient to his infinite wisdom; and none of his subjects or creatures can have a right to say to him, What dost thou? But the dispensing or withholding of benefits is a transaction very different from the entering into covenants; and a judgment is to be formed of it upon very different principles. Every thing around us proclaims that the Sovereign of the Universe is a being of perfect benevolence; but, say the disciples of the school now under consideration, the dispensation given to Adam in paradise was so far from being the offspring of benevolence, that, as it is understood by the followers of Calvin, it cannot possibly be reconciled with the eternal laws of equity. The self-existent and all-sufficient God might or might not have created such a being as man; and in either case there would have been no reason for the question "What dost thou?" But as soon as he determined to create him capable of happiness or misery, he would not have been either benevolent or just, if he had not placed him in a state where, by his own exertions, he might, if he chose, have a greater share of happiness than of misery, and find his existence, upon the whole, a blessing. They readily acknowledge, that the existence of any created being may be of longer or shorter duration, according to the good pleasure of the Creator; and therefore they have no objection to the apostolic doctrine, that "in Adam all die:" for immortality being not a debt, but a *free gift*, may be bestowed upon any terms whatever, and with perfect justice withdrawn when these terms are not complied with. Between death, however, as it implies a loss of consciousness, and the extreme misery of eternal life in torments, there is an immense difference. To death all mankind might justly be subjected through the offence of one; because they had originally no claim of right to be exempted from it, though that one and they too had remained for ever innocent: but eternal life in torments is a punishment which a God of justice and benevolence can never inflict but upon personal guilt of the deepest die. That we can personally have incurred guilt from a crime committed some thousands of years before we were born, is impossible. It is indeed a notion, if such a notion can be formed, as contrary to Scripture as to reason and common sense: for the apostle expressly informs us*, *1 John iii. "that sin is the transgression of some law;" and the sin of Adam was the transgression of a law which it was never in our power either to observe or to break. Another apostle† † Rom. iv. assures us, that "where no law is, there is no transgression;"‡ but there is now no law, nor has been any these 5000 years, forbidding mankind to eat of a particular fruit; for, according to the Calvinists themselves‡, Adam had no sooner committed his first sin, by which the covenant with him was broken, than he ceased to be a covenant-head. The law given

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Objections
to it,

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As incon-
sistent with
the justice
of God.

Gill's Be-
dy of Divi-
nity, book
iii. ch. 10.
given

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quences.

given him was no more; the promise of life by it ceased; and its sanction, death, took place. But if this be so, how is it possible that his unborn posterity should be under a law which had no existence, or that they should be in a worse state in consequence of the covenant being broken, and its promise having ceased, than he himself was before the covenant was first made? He was originally a mortal being, and was promised the supernatural gift of immortality on the single condition of his abstaining from the fruit of the tree of knowledge of good and evil. From that fruit he did not abstain; but by eating it fell back into his natural state of mortality. Thus far it is admitted that his posterity fell with him; for they have no claim to a supernatural gift which he had forfeited by his transgression. But we cannot admit, say the divines of this school, that they fell into his guilt; for to render it possible for a man to incur guilt by the transgression of a law, it is necessary not only that he have it in his power to keep the law, but also that he be capable of transgressing it by a *voluntary* deed. But surely no man could be capable of voluntarily eating the forbidden fruit 5000 years before he himself or his volitions existed. The followers of Calvin think it a sufficient objection to the doctrine of transubstantiation, that the same numerical body cannot be in different places at the same instant of time. But this ubiquity of body, say the remonstrants, is not more palpably absurd, than the supposition that a man could exert volitions before he or his will had any existence. If indeed there be any difference between the two cases, it is in favour of the Catholic doctrine of the real presence; for we are by no means so intimately acquainted with the internal substance of body, and what can be predicated of it, as we are with the nature of guilt and the exercise of volition. These we know thoroughly as they really are in themselves; the former only relatively as it is seen in its qualities.

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The scrip-
ture, and
the nature
of things.

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The word
IMPUTA-
TION re-
moves no
difficulties.

Nor will the introduction of the word *imputation* into this important question remove a single difficulty. For what is it that we mean by saying that the sin of Adam is imputed to his posterity? Is the guilt of that sin transferred from him to them? So surely thought Dr Gill, when he said that it is made over to them. But this is the same absurdity as the making over of the sensible qualities of bread and wine to the internal substance of our Saviour's body and blood! This imputation either found the posterity of Adam guilty of his sin, or it made them so. It could not find them guilty for the reason already assigned; as well as because the apostle says expressly, that for the offence of *one* judgment came upon *all* men, which would not be true had *all* offended. It could not make them guilty; for this reason, that if there be in physics or metaphysics a single truth self-evident, it is, that the numerical powers, actions, or qualities, of one being cannot possibly be transferred to another, and be made its powers, actions, or qualities. Different beings may in distant ages have qualities of the same kind; but as easily may 4 and 3 be made equal to 9, as two beings be made to have the same identical quality. In Scripture we nowhere read of the actions of one man being imputed to another. "Abraham (we are told) believed in God, and it was counted to him for righteousness;" but it was his *own* faith, and not the faith of another man, that was so counted. "To him that worketh not, but believeth, his faith (not another's) is imputed for righteousness." And of our faith in him that raised Christ from the dead, it is said, that "it shall be imputed, not to our fathers or our children, but to us for righteousness."

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Meaning of
that word
in scrip-
ture.

When this phrase is used with a negative, not only is the man's own personal sin spoken of, but the non-imputation of that sin means nothing more but that it brings not upon the sinner condign punishment. Thus when Shemei "said

unto David, Let not my lord *impute* iniquity unto me;" it could not be his meaning that the king should not think that he had offended; for with the same breath he added, "Neither do thou remember that which thy servant *did* *per-
versely*, the day that my lord the king went out of Jerusa-
lem, that the king should take it to his heart. For thy
servant doth *know* that *I have sinned*." Here he plainly
confesses his sin, and declares, that by intreating the king
not to *impute* it to him, he wished only that it should not be
so remembered as that the king should take it to heart, and
punish him as his perverseness deserved. When therefore it
is said *, that "God was in Christ reconciling the world to
himself, not imputing to them their iniquities, the meaning
is only that for Christ's sake he was pleased to exempt them
from the punishment due to their sins. In like manner,
when the prophet, foretelling the sufferings of the Messiah,
says, that "the Lord laid on him the iniquity of us all,"
his meaning cannot be, that the Lord by *imputation* made his
immaculate Son guilty of all the sins that men have ever
committed; for in that case it would not be true that the
"just suffered for the unjust," as the apostle expressly
teaches §: but the sense of the verse must be as Bishop Co-
verdale translated it, "through him the Lord pardoneth all
our sins." This interpretation is countenanced by the an-
cient version of the Seventy, *καὶ κύριος παρέδωκεν αὐτὸν ταῖς
ἀμαρτίαις ἡμῶν*; words which express a notion very different
from that of imputed guilt. The Messiah was, without a
breach of justice, delivered for sins of which he had volunta-
rily offered to pay the penalty; and St Paul might have
been justly charged by Philemon with the debts of Onesi-
mus, which he had desired might be placed to his account.
Had the apostle, however, expressed no such desire, surely
Philemon could by no deed of his have made him liable for
debts contracted by another; far less could he by *imputation*,
whatever that word may mean, have made him virtually
concur in the contracting of those debts. Just so it seems to
be with respect to the sufferings of Christ for the sins of
men: He could not have been justly subjected to suffering
without his own consent; and he could not possibly
have been made guilty of the sins of those for whom he suf-
fered.

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its conse-
quences.

2 Cor. v.

§ 1 Peter iii.

The doctrine of imputed guilt therefore, as understood by the Calvinists, is, in the opinion of their opponents, without foundation in Scripture, and contrary to the nature of things. It is an impious absurdity (say they), to which the mind can never be reconciled by the hypothesis, that all men were in Adam both seminally and federally, and sinned in him, as Levi paid tithes to Melchizedek in the loins of Abraham. The apostle, when he employs that argument to lessen in the minds of his countrymen the pride of birth and the lofty opinions entertained of their priesthood, plainly intimates, that he was using a bold figure, and that Levi's paying tithes is not to be understood in a strict and literal sense. "Now consider (says he) how great this man was, unto whom even the patriarch Abraham gave the tenth of the spoils. And, as I may so say, Levi also, who receiveth tithes, paid tithes in Abraham: for he was yet in the loins of his father when Melchizedek met him." This is a very good argument to prove that the Levitical priesthood was inferior in dignity to that of Melchizedek; and by the apostle it is employed for no other purpose. Levi could not be greater than Abraham, and yet Abraham was inferior to Melchizedek. This is the whole of St Paul's reasoning, which lends no support to the doctrine of original sin, unless it can be shown that Levi and all his de-
scendants contracted from this circumstance such a strong
propensity to the *paying* of tithes, as made it a matter of
extreme difficulty for them, in every subsequent generation, to

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Moral guilt
cannot be
transmitted
from father
to son.

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to comply with that part of the divine law which constituted them *receivers* of tithes. That all men were feminally in Adam, is granted; and it is likewise granted that they may have derived from him, by ordinary generation, diseased and enfeebled bodies: but it is as impossible to believe that moral guilt can be transmitted from father to son by the physical act of generation, as to conceive a scarlet colour to be a cube of marble, or the sound of a trumpet a cannon ball. That Adam was as fit a person as any other to be entrusted with the good and happiness of his posterity, may be true; but there is no fitness whatever, according to the Arminians, in making the everlasting happiness or misery of a whole race depend upon the conduct of any fallible individual. "That any man should so represent me (says Dr Taylor *), that when he is guilty, I am to be reputed guilty; when he transgresses, I shall be accountable and punishable for his transgression; and this before I am born, and consequently before I am in any capacity of knowing, helping, or hindering, what he doth: all this every one who useth his understanding must clearly see to be false, unreasonable, and altogether inconsistent with the truth and goodness of God." And that no such appointment ever had place, he endeavours to prove, by showing that the texts of Scripture upon which is built the doctrine of the Calvinists respecting original sin, will each admit of a very different interpretation.

* Doctrine of Original Sin, part iii.

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The several texts on which this doctrine is built capable of a different interpretation.

One of the strongest of these texts is Romans v. 19. which we have already quoted, and which our author thus explains. He observes, that the apostle was a Jew, familiarly acquainted with the Hebrew tongue; that he wrote his epistle as well for the use of his own countrymen residing in Rome, as for the benefit of the Gentile converts; and that though he made use of the Greek language, as most generally understood, he frequently employed Hebrew idioms. Now it is certain that the Hebrew words פשע and חטא, "sin and iniquity," are frequently used in the Old Testament to signify *suffering*, by a figure of speech which puts the effect for the cause; and it is surely more probable, that in the verse under consideration, the apostle used the corresponding Greek word ἁμαρτωλοὶ in the same Hebrew sense, than that he meant to contradict what he had said in the former verse, by teaching that all men were made guilty of an act of disobedience committed thousands of years before the majority of them had any being. In the preceding verse he says, "that by the offence of one, judgment came upon all men to condemnation." But this cannot be true, if by that offence all men were made sinners; for then judgment must have come upon each for his own share in the original disobedience. "Any one may see (says our author) that there is a vast difference between a man's making *himself* a sinner by his *own* wicked act, and his being made a sinner by the wicked act of *another*. In the latter case, he can be a sinner in no other sense but as he is a sufferer; just as Lot would have been made a sinner with the Sodomites, had he been consumed in the iniquity of the city; and as the subjects of Abimelech would have been made sinners, had he, in the integrity of his heart, committed adultery with Abraham's wife*. That the people of Gerar could have contracted any real guilt from the

§ Gen. xix. 15.

* Gen. xx.

adultery of their sovereign, or that he, by lying with a woman whom he had reason to believe to be not the wife but the sister of another man, would have incurred all the moral turpitude of that crime, are positions which cannot be maintained. Yet he says, that Abraham had brought upon him and on his kingdom a *great sin*; though it appears, from comparing the 6th verse with the 17th and 18th, that he had not been brought under sin in any other sense than as he was made to suffer for taking Sarah into his house. In this sense, "Christ, though we are sure that he knew no sin, was made sin for us, and numbered with the transgressors," because he suffered death for us on the cross; and in this sense it is true, that by the disobedience of Adam all mankind were made sinners, because, in consequence of his offence, they were by the judgment of God made subject to death.

But it may be thought that this interpretation of the words *sin* and *sinners*, though it might perhaps be admitted in the 19th verse, cannot be supposed to give the apostle's real meaning, as it would make him employ in the 12th verse an absurd argument, which has been already noticed. But it may perhaps be possible to get quit of the absurdity, by examining the original text instead of our translation. The words are, καὶ οὕτως εἰς πάντας ἀνθρώπους ὁ θάνατος διήλθεν, ἐφ' ᾧ πάντες ἥμαρτον. In order to ascertain the real sense of these words, the first thing to be done is to discover the antecedent to the relative φ. Our translators seem to consider it as used absolutely without any antecedent; but this is inaccurate, as it may be questioned whether the relative was ever used in any language without an antecedent either expressed or understood. Accordingly, the Calvinist critics, and even many Remonstrants, consider ἕως ἀνθρώπου in the beginning of the verse as the antecedent to φ in the end of it, and translate the clause under consideration thus: "And so death hath passed upon all men, in whom (*viz.* Adam) all have sinned." θάνατος, however, stands much nearer to φ than ἀνθρώπου; and being of the same gender, ought, we think, to be considered as its real antecedent: but if so, the clause under consideration should be thus translated: "and so death hath passed upon all men, unto which (o) all have sinned, or, as the Arminians explain it, have suffered. If this criticism be admitted as just, ἐφ' ᾧ must be considered as standing here under a particular emphasis, denoting the utmost length of the consequences of Adam's sin (p); as if the apostle had said, "so far have the consequences of Adam's sin extended, and spread their influence among mankind, introducing not only a curse upon the earth, and sorrow and toil upon its inhabitants, but even DEATH, UNIVERSAL DEATH, in every part, and in all ages of the world." His words (say the Remonstrants) will unquestionably bear this sense; and it is surely much more probable that it is their true sense, than that an inspired writer should have taught a doctrine subversive of all our notions of right and wrong, and which, if really embraced, must make us incapable of judging when we are innocent and when guilty.

When the apostle says that there is none righteous, no not one, he gives us plainly to understand that he is quoting from the 14th Psalm; and the question to be first answered is, In what sense were these words used by the Psalmist?

(o) That εἰς, when construed with a dative case, often signifies *to* or *unto*, is known to every Greek scholar. Thus ἐπ' εὐδοξίᾳ ὁδός, *the way to fame*, (Lucian.) Κακούργος εἰς τὸ θάνατον, *a criminal unto death*, (Demosth.) ἐπὶ θανάτῳ συλλαβεῖν, *to carry to death or execution*, (Isoc.) τ' μὲν ἐπ' ἐλευθερίᾳ ἐκλήθητε, *ye have been called to liberty*, (Gal. v. 13.) Κτισθέντες ἐν Χριστῷ Ἰησοῦ ἐπὶ ἔργοις ἀγαθοῖς, *created in Christ Jesus unto good works*, (Ephes. ii. 10.) See also 1 Thes. iv. 7.; 2 Tim. ii. 14.; and many other places of the New Testament.

(p) ἐφ' ᾧ has likewise this import, denoting the *terminus ad quem* in Phil. iii. 12. and iv. 10.

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quences.

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mid? That they were not meant to include all the men and women then living, far less all that have ever lived, is plain from the fifth verse of the same Psalm, where we are told that those wicked persons "were in great fear, because God was in the congregation of the righteous." There was then, it seems, a congregation of righteous persons, in opposition to those called the *children of men*, of whom alone it is said that there was none that did good, no not one. The truth is, that the persons of whom David generally complains in the book of Psalms, constituted a strong party disaffected to his person and government. That faction he describes as proud and oppressive, as devising mischief against him, as violent men continually getting together for war. He styles them his *enemies*; and sometimes characterizes them by the appellation which was given to the apostate descendants of Cain before the deluge. Thus in the 57th Psalm, which was composed when he fled from Saul to the cave in which he spared that tyrant's life, he complains, "I lie among them that are set on fire, even the *sons of men*, whose teeth are spears," &c.; and again, in the 58th Psalm, he says, "Do ye indeed speak righteousness, O congregation? Do ye judge uprightly, O ye sons of men?" By comparing these texts with 1 Sam. xxvi. 19. it will appear evident beyond dispute, that by the *sons of men* mentioned in them, he meant to characterize those enemies who exasperated Saul against him. Now it is well known, that there was a party adhering to the interests of the house of Saul which continued its enmity to David during the 40 years of his reign, and joined with Absalom in rebellion against him only eight years before his death. But it is the opinion of the most judicious commentators §, that the 14th Psalm was composed during the rebellion of Absalom; and therefore it is surely much more probable, that by the *children of men*, of whom it is said there is "none that doth good, no not one," the inspired poet meant to characterize the rebels, than that he should have directly contradicted himself in the compass of two sentences succeeding each other. Had he indeed known that all the children of men, as descending from Adam, "are utterly indisposed, disabled, and made opposite to all that is spiritually good, and wholly and continually inclined to all evil," he could not, with the least degree of consistency, have represented the Lord as looking down from heaven upon them, to see if there were any that did understand and seek after God; but if by the children of men was meant only the rebel faction, this scenical representation is perfectly consistent, as it was natural to suppose that there might be in that faction some men of good principles misled by the arts of the rebel chiefs.

§ Hammond
&c.

Having thus ascertained the sense of the words as originally used by the Psalmist, the Arminian proceeds to inquire for what purpose they were quoted by the apostle; and in this inquiry he seems to find nothing difficult. The aversion of the Jews from the admission of the Gentiles to the privileges of the gospel, the high opinion which they entertained of their own worth and superiority to all other nations, and the strong persuasion which they had that a strict obedience to their own law was sufficient to justify them before God, are facts universally known; but it was the purpose of the apostle to prove that all men stood in need of a Redeemer, that Jews as well as Gentiles had been under the dominion of sin, and that the one could not in that respect claim any superiority over the other. He begins his epistle, therefore, with showing the extreme depravity of the Heathen world; and having made good that point, he proceeds to prove, by quotations from the book of Psalms, Proverbs, and Isaiah, that the Jews were in nowise better than they, that every mouth might be stopped, and all the world be-

come guilty, or insufficient for their own justification before God.

The next proof brought by the Calvinists in support of their opinion, that all men derive guilt from Adam by ordinary generation, is that text in which St Paul says that the Ephesians "were by *nature* children of wrath even as others." To this their opponents reply, that the doctrine of original sin is in this verse, as in the last quoted, countenanced only by our translation, and not by the original Greek as understood by the ancient fathers of the Christian church, who were greater masters of that language than we. The words are *καὶ ἡμεῖς τέκνα φύσει ὀργῆς*; in which it is obvious, that *τέκνα*, though in its original sense it signifies the genuine children of parents by natural generation, cannot be so understood here; because no man was ever begotten by, or born of, the abstract notion *wrath*. It must therefore be used figuratively; and in other places of scripture it often denotes a close relation to any person or thing. Thus we read of the children of God, of the kingdom, the resurrection, wisdom, light, obedience, and peace; whence it is concluded, that by the children of wrath are meant those who are liable to punishment or rejection. And because there were in those days some children, in a lower and less proper sense, by adoption, and others, in a higher and more proper sense, by *natural generation*, of whom the relation of the latter to their parents was much closer than that of the former; the apostle tells the Ephesians, that they were by *nature* children of wrath, to convince them that they were *really* liable to it by the strictest and closest relation possible. That the word *φύσει* here is of the same import with *really* or *truly*, and that it does not signify what we mean by *nature* in the proper sense of that word, the ancient fathers are generally agreed*; and that the modern Greeks, who still speak a dialect of the noble language of their ancestors, understand the word in the same sense, is apparent from their version of the text before us. In the most correct and elegant edition of the New Testament in their vernacular tongue, the words under consideration are thus rendered; *καὶ φυσικῶς ἡμεῖς ὅταν τέκνα ὀργῆς ὡσαν καὶ οἱ λοιποὶ*, where it is impossible that *φυσικῶς* can signify *natural*, otherwise the apostle will be made to say, not that we are by the nature derived from Adam liable to wrath, but that we were *naturally begotten* by *wrath* in the abstract! For taking the word *φύσει* in the sense of *really* or *truly*, both the ancient and modern Greeks appear indeed to have the authority of St Paul himself; who, writing to Timothy, calls him *γνησίον τέκνον* "his true or genuine son;" not to signify that he was the child of the apostle by natural generation, but that he was closely related to him in the faith to which St Paul had converted him. That the words *τέκνα φύσει ὀργῆς* can signify nothing but *truly* or *really relations to wrath*, is still farther evident from the ground assigned of that relation. It is not the sin of Adam, or the impurity of natural generation, "but the trespasses and sins in which the Ephesians in time past *walked*, according to the course of the world, according to the prince of the power of the air," the spirit that at the time of the apostle's writing "worked in the children of disobedience." Surely no man can suppose that the Ephesians at any past time *walked* in Adam's trespass and sin, or that the prince of the power of the air tempted *them* to eat the forbidden fruit.

Having thus commented on the principal texts which are cited from the New Testament to prove the doctrine of original sin, the Arminians treat those which are quoted from the Old Testament, in support of the same doctrine, with much less ceremony. Thus, when Job says, "who

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* Scripture
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part ii.

can bring a clean thing out of an unclean? Not one," he is speaking, say they, not of the pravity of our nature, but of its frailty and weakness, of the shortness and misery of human life. The sentence is proverbial; and as it is used only to signify, that nothing can be more perfect than its original, it must, whenever it occurs, be understood according to the subject to which it is applied. That in the place under consideration it refers to our mortality, they think plain from the context; and Dr Taylor adds*, with some plausibility, that if the words refer to the guilt which we are supposed to derive from Adam, they will prove too much to serve the common scheme of original sin. They will prove that our natural and inherent pravity, so far from rendering us fit subjects of wrath, may be urged as a reason why God should not even bring us into judgment; for the patriarch's whole expostulation runs thus, "Dost thou open thine eyes upon such a one, and bringest me into judgment with thee? Who can bring a clean thing out of an unclean?"

The other text, quoted from the same book, they think still less to the purpose; for Eliphaz is evidently contrasting the creature with the Creator; in comparison with whom, he might well say, without alluding to original guilt, "what is man that he should be clean? and he who is born of a woman that he should be righteous? Behold he putteth no trust in his saints; yea the heavens are not clean in his sight. How much more abominable and filthy is man, who drinketh iniquity like water?" He does not say, who derives by birth an iniquitous nature; for he knew well, that as we are born, we are the pure workmanship of God, "whose hands have fashioned and formed every one of us;" but "who drinketh iniquity like water," who maketh himself iniquitous by running headlong into every vicious practice.

† Ubi Su-
pra.

‡ See his
Lexicon on
the word
con.

§ Gen. xxx.
38, 39, 40.
compared
with xxxi.
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Of the text quoted from the fifty-first psalm in support of the doctrine of original sin, Dr Taylor labours†, by a long and ingenious criticism, to prove that our translators have mistaken the sense. The word which they have rendered *shapen*, he shews to be used once by Isaiah, and twice in the book of Proverbs, to signify *brought forth*; and that which is rendered *conceived me*, is never, he says, employed in scripture to denote human conception. In this last remark, however, he is contradicted by a great authority, no less indeed than that of Mr Parkhurst‡, who says, that the LXX constantly render it by *κισσαω* or *εγκισσαω*, and the Vulgate generally by *concipio*. Without taking upon us to decide between these two eminent Hebrew scholars, we shall only observe, that upon one occasion§ it certainly denotes ideas much grosser than those which the Psalmist must have had of his mother's conception; and that there, at least, Dr Taylor properly translates it *incalescant*, adding, "de hoc vero incalescendi genere loqui Davidem nemo sanus existimare potest. Matrem enim incaluisse, aut ipsum calefecisse eo modo quo incalescerent Jacobi pecudes Regem dicere, prorsus indecorum et absurdum." He contends, however, that the original force of the word is *to be hot*, and that it is applied to *conception*, to *resentment*, to *warmth* by which the body is nourished, to *idolaters* in love with idols, and to the heat of metals. The heat of idolaters, of resentment, and of metals, are evidently foreign to the Psalmist's purpose; and the idea conveyed by the word *incalescere* being set aside for the reasons already assigned, there remains only the warmth by which the body is nourished, and of that warmth our author is confident that David spoke.

If this criticism be admitted, the whole verse will then run thus: "Behold I was born in iniquity, and in sin did my

mother nurse me;" which hath no reference to the original formation of his constitution, but is a periphrasis of his being a *sinner from the womb*, and means nothing more than that he was a *great sinner*, or had contracted *early habits* of sin. He no more designed to signify in this verse, that by ordinary generation he had a nature conveyed to him which was "utterly indisposed, disabled, and opposite to all that is spiritually good, and wholly and continually inclined to evil," than he meant in another‡ to signify† Pl. lviii. strictly and properly that "the wicked are estranged from the womb, and TELL LIES as soon as they are born;" or than Job meant to signify||, that from the moment he came from his mother's womb he had been a guide to the widow and a succour to the fatherless. All these are hyperbolical forms of expression; which, though they appear strained, and perhaps extravagant, to the phlegmatic inhabitants of Europe, are perfectly suited to the warm imaginations of the orientals, and to the genius of eastern languages. They mean not that Job was *born* with *habits* of *virtue*, that the wicked actually *walked*, and *spoke*, and *spoke lies* from the instant of their *birth*, or that the Psalmist was really *shapen* in *sin* and *conceived* in *iniquity*. This last sentence, if interpreted literally, would indeed be grossly impious: it would make the inspired penman throw the whole load of his iniquity and sin from off himself upon him who shaped and upon her who conceived him; even upon that God "whose hands had made him and fashioned him, and whom he declares that he will praise for having made him fearfully and wonderfully," and upon that parent who conceived him with sorrow, and brought him forth with pain, and to whom the divine law commanded him to render honour and gratitude. "But if, after all (says Dr Taylor*), you will adhere to the literal sense of the text for the common doctrine of *original sin*, shew me any good reason why you ought not to admit the literal sense of the text, *this is my body*, for *transubstantiation*? If you say, it is absurd to suppose that Christ speaks of his real natural body; I say, it is likewise absurd to suppose that the Psalmist speaks of his being really and properly shapen in iniquity, and conceived in sin. If you say, that the sense of the words *this is my body* may be clearly explained by other texts of scripture where the like forms of speech are used; I say, and have shewn, that the Psalmist's sense may as clearly and evidently be made out by parallel texts, where you have the like kind of expression. If you say that transubstantiation is attended with consequences hurtful to piety, I say that the common doctrine of original sin is attended with consequences equally hurtful; for it is a principle apparently leading to all manner of iniquity to believe that sin is natural to us, that it is interwoven and ingrafted into our very constitution from our conception and formation in the womb."

The Arminians having thus, as they think, proved that the posterity of Adam are not in any sense rendered guilty by his sin, contend, that the death threatened against his eating of the forbidden fruit, and which, in consequence of his transgression, came upon all men, can mean nothing more than the loss of that vital principle which he received when God breathed into his nostrils the breath of life, and he became a living soul. Every thing beyond this is pure conjecture, which has no foundation in the scriptures of truth, and is directly contrary to all the notions of right and wrong which we have been able to acquire from the study of those very scriptures. It is not conceivable from any thing in the history, that Adam could understand it of the loss of any other life than that which he had lately received, for no other life is spoken of to which the threatened death can be opposed; and in such circumstances it was strange

* Scripture
Doctrine,
part ii.

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strange indeed, if by the word *death* he understood either eternal life in misery, or a necessity of continuing in sin. The sense therefore of the threatening, say they, is this; "I have formed thee of the dust of the ground, and breathed into thy nostrils the breath of life; and thus thou art become a living soul. But if thou eatest of the fruit of the tree of knowledge of good and evil, thou shalt cease to be a living soul; for I will take from thee the breath of life, and thou shalt return to the dust of which thou wast formed."

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them admit
the deprav-
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Thus far the Arminians of the present day (Q) are agreed in opposing the doctrine of the rigid Calvinists, and in stating their own notions of the consequences of Adam's fall; but from that event their adversaries deduce one consequence, which some of them admit and others deny. It is said, that though we cannot possibly be partakers in Adam's guilt, we yet derive from him a moral taint and infection, by which we have a natural propensity to sin; that having lost the image of God, in which he was created, Adam begat sons in his own image; and in one word, that the sensual appetites of human nature were inflamed, and its moral and intellectual powers greatly weakened by the eating of the forbidden fruit. The heathens themselves acknowledged and lamented this depravity, though they were ignorant of the source from which it sprung. The scriptures assert it, affirming that no man can be born pure and clean; that whatever is born of the flesh, or comes into the world by ordinary generation, is flesh, carnal and corrupt; that the imagination of the thoughts of man's heart is only evil continually; that the heart is deceitful above all things and desperately wicked; and that out of it proceeds all that

Job xiv. is vile and sinful ||.
4. John iii.
6. Rom. iii.
9. Gen. vi.
5. Jer. xvii.
9. Mat. xv.
19.
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And illu-
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ledge.
† Delany's
Revelation
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sert. 1. and
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is vile and sinful ||. This depravity of human nature, thus clearly deducible from scripture, and confirmed by the testimony of ages, an ingenious writer of the moderate Arminian school undertakes to illustrate upon the principles of natural knowledge. "We know (says he†), that there are several fruits in several parts of the world of so noxious a nature as to destroy the best human constitution upon earth. We also know that there are some fruits in the world which inflame the blood into fevers and frenzies; and we are told that the Indians are acquainted with a certain juice, which immediately turns the person who drinks it into an idiot, leaving him at the same time in the enjoyment of his health and all the powers of this body. Now I ask, Whether it is not possible, nay whether it is not rational, to believe, that the same fruit, which, in the present infirmity of nature, would utterly destroy the human constitution, might, in its highest perfection, at least disturb, impair, and disease it? and whether the same fruit, which would now in-

flame any man living into a fever or a frenzy, might not inflame Adam into a turbulence and irregularity of passion and appetite? and whether the same fluids, which inflame the blood into irregularity of passion and appetite, may not naturally produce infection and impair the constitution? That the forbidden fruit had the effect to produce irregularity of appetite, appears as from other proofs, so I think fully and clearly from the covering which Adam and Eve made use of soon after their offence; for there is no imaginable reason for that covering but one, and that one sufficiently demonstrates, that irregularity and violence of appetite, independent of the dominion of reason, was the effect of their offence. But the fruit which inflamed the sensual appetite might likewise debase their rational powers; for I ask, whether the same juice, which now affects the brain of an ordinary man so as to make him an idiot, might not affect the brain of Adam so as to bring his understanding down to the present standard of ordinary men? And if this be possible, and not absurd to be supposed, it is evident that the subsequent ignorance and corruption of human nature may be clearly accounted for upon these suppositions; nay, I had almost said upon any one of them. For it is universally known, that the infections and infirmities of the father affect the children yet in his loins; and if the mother be equally infected, must, unless removed by proper remedies, affect their posterity to the end of the world, or at least till the race become extinct. Therefore why all mankind might not by their first father's sin be reduced to the same condition of infirmity and corruption with himself, especially when the mother was equally infirm and infected, I believe no man any way skilled in the knowledge of nature will so much as pretend to say."

This account of the corruption of human nature seems to be generally adopted by moderate divines, as well among the Calvinists as among the Arminians; but by the high-fliers in both schools it is rejected, upon different principles indeed, with great indignation. The zealous Calvinist contends, that this hereditary corruption is not to be accounted for or attempted to be explained by any principle of physical science, since it is part of that punishment which was inflicted on the race for their original sin. If we were not partakers of Adam's guilt, say they, we should not have been partakers of his corruption. The one is previous to the other, and the foundation of it. The depravity of human nature is a punishment for sin; and so it was threatened to Adam, and came upon him as such, and so to all his posterity, by the *ordination and appointment of God*; for which there can be no other foundation but the imputation of Adam's disobedience to them, nor can any thing else vindicate the righteousness of God. For if the law of na-
ture

(Q) We say the Arminians of the *present day*; because in the beginning of this century many of them having imbibed the scholastic notion of the *natural and essential* immortality of the soul, seem to have been at a loss to conceive how it was to have been disposed of, had there been no redemption from Adam's curse. They were persuaded, that for his sin the souls of his posterity did not deserve eternal punishment; and as eternal *life* is everywhere in the New Testament represented as the gift of God through Jesus Christ, they thus expressed themselves concerning the death incurred by the fall of Adam. "It is well to be observed, that the *death* wherewith God threatened man as his punishment if he broke the covenant, is not in reason to be understood of *eternal death*, any farther than as by eternal death may be signified only the *eternal separation* of the *soul from the body*, and also the *eternal exclusion* of the *soul from God*, or *heavenly blest*." That the death threatened implied the annihilation of the soul, seems never to have occurred to them, though the apostle expressly says, that if there be no resurrection, "then they who are fallen asleep in Christ are perished," *απολλοι* "are lost." They supposed that the sin of Adam would have separated the soul from the body, and excluded the former both from heaven and from hell; but what would have become of it in that state of exclusion, both from future happiness and future misery, we do not remember at present that any one of them has hazarded a conjecture. See *Dr Wells's Help for the Right Understanding of the Several Divine Laws and Covenants*; and bishop Bull's *Harmonica Apostolica*, with its several defences.

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† Gill's Bo-
dy of Divi-
nity, book
iii. ch. 10,
11. and 13.

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the doc-
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† Scripture
Doctrine,
&c.

ture was sufficient, why should this *original* taint infect men rather than the sins of their immediate parents †?"

The more violent Arminians, on the other hand, deny that we inherit any moral taint whatever from Adam, or that the rational powers of our minds are naturally weaker than his were. Of that wonderful degree of perfection which is usually attributed to the first pair, they find no evidence in scripture. All that we learn of them, say they, is, that they fell from a state of exquisite happiness by yielding to a temptation less powerful by far than some others which many of their degenerate sons have successfully resisted.

"I leave you to judge (says Dr Taylor †), whether Joseph, when he resisted the solicitations of his mistress, and Moses when he refused to be called the son of Pharaoh's daughter, choosing rather to suffer affliction with the people of God than to enjoy the pleasures of sin for a season, esteeming the reproach of true religion greater riches than the treasures of Egypt, did not exhibit proofs of regularity of passions and appetites equal at least to what Adam displayed in the garden of Eden. When the three young men mentioned in the book of Daniel submitted to be burnt alive in a fiery furnace rather than worship Nebuchadnezzar's golden image; when Daniel himself resolved, rather than conceal the worship of God for one month only of his life, to be torn in pieces by hungry lions; and, to come nearer to our own times, when numbers of men and women, during the reign of Mary Queen of England, chose rather to be burnt at a stake than renounce the reformed religion and embrace the errors of popery—surely all these persons exhibited a virtue, a faith in God, and a steady adherence to what they believed to be the truth, far superior to what Adam displayed, when his wife gave him of the forbidden fruit, and he did eat."

If it be said that these persons were supported under their trials by the grace of God strengthening them, the same will be said of Adam. He was undoubtedly supplied with every aid from the spirit of grace which was necessary to enable him to fulfil his duty; for being designed for more than mere animal life, even for the refined enjoyments of heaven, there is every reason to believe, as we have already observed, that he was put under the guidance of the Holy Ghost, to train him for that supernatural state of felicity. These communications of the spirit would of course be withdrawn when he forfeited his right to those privileges, on account of which they were originally vouchsafed to him; but that any positive malignity or taint was infused into his nature, that his mere rational powers were weakened, or his appetites inflamed by the forbidden fruit, there is no evidence to be found in scripture, or in the known constitution of things. The attributing of this supposed hereditary taint to the noxious qualities of the forbidden fruit, is a whimsical hypothesis, which receives no countenance from any well authenticated fact in natural history. After the numberless falsehoods that have been told of the poison tree of Java (see *Poison Tree*), something more would be requisite than the common evidence of a lying voyager to give credit to the qualities of the Indian tree, of which the fruit instantly turns

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the wisest man into an idiot: and yet for this singular story our ingenious author vouchsafes not even that evidence, slight as it generally is. The inference drawn from the covering used by our first parents is contradicted by every thing that we know of human nature; for surely no man, inflamed to the utmost with the fire of animal love, ever turned his eyes from a naked beauty ready and eager to receive him to her embrace. Yet this, it seems, was the behaviour of Adam and Eve in such a state! According to our author, the juice of the forbidden fruit had rendered their carnal appetites violent and independent of reason; according to the scripture, they were both naked; and as they were husband and wife, there was no law prohibiting them from gratifying these inflamed appetites. In such circumstances, how did they conduct themselves? One would naturally imagine that they immediately retired to some shady grove, and pleased themselves in all the soft dalliances of wedded love. Their conduct, however, was very different. We are told, that "they sewed fig-leaves together, and made themselves aprons to cover their nakedness." And this transaction is brought as a proof of the impetuosity of their carnal appetites (R). The truth is, that the carnal appetite appears not to be naturally more violent than is necessary to answer the end for which it was implanted in the human constitution. Among savages the desires of animal love are generally very moderate; and even in society they have not often, unless inflamed by the luxurious arts of civil life, greater strength than is requisite to make mankind attend to the continuation of their species. In the decline of empires highly polished, where the difference of rank and opulence is great, and where every man is ambitious of emulating the expence of his immediate superiors, early marriages are prevented by the inability of most people to provide for a family in a way suitable to what each is pleased to consider as his proper station; and in that state of things the violence of animal love will indeed frequently produce great irregularities. But for that state of things, as it was not intended by the Author of nature, it is perhaps unreasonable to suppose that provision should be made; and yet we believe it will be found, upon due consideration, that if the desires of animal love were less violent than they are, the general consequences would be more pernicious to society than all the irregularities and vices which these desires now accidentally produce; for there would then be no intercourse between the sexes whatever except in the very highest stations of life. That our constitution is attended with many sensual appetites and passions, which, if suffered to grow excessive or irregular, become sinful, is true; and that there is great danger of their becoming excessive and irregular in a world so full of temptation as ours is, is also true; but there is no evidence that all this is the consequence of Adam's fall, and far less that it amounts to a *natural propensity* to sin. "For I presume (says Dr Taylor), that by a natural propensity is meant a necessary inclination to sin, or that we are necessarily sinful from the original bent and bias of our natural powers. But this must be false; for then we should not be

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(R) We have never met with a satisfactory reason for the expedient of these fig-leave-coverings. To us the following has sometimes occurred as an account of the matter, at least more plausible than that which has been assigned by Dr Delany. Persons under the agonies of remorse, or with the prospect of immediate death before them, have no relish for the pleasures of love; and as our first parents, upon eating the forbidden fruit, must have been in the one or other of these situations, they might think of sewing fig-leaves together, and making themselves aprons, as a mean of subduing an appetite, of which, at that instant, they must have abhorred the gratification. If they had any hope of a reprieve from death, and yet knew all the consequence of their sin, their most ardent wish would be to have no children; and not being acquainted as we are with the effects of dress, they would naturally imagine that their proposed coverings would diminish the force of the sexual appetite.

be sinful at all, because that which is necessary, or which we cannot help, is not sin. That we are weak and liable to temptation, is the will of God holy and good, and for glorious purposes to ourselves; but if we are wicked, it must be through our own fault, and cannot proceed from any constraint, or necessity, or taint in our constitution."

Thus have we given as full and comprehensive a view as our limits will permit of the different opinions of the Calvinists and Arminians respecting the consequences of Adam's fall. If we have dwelt longer upon the scheme of the latter than of the former, it is because every Arminian argument is built upon criticism, and appeals to the original text; whilst the Calvinists rest their faith upon the plain words of scripture as read in our translation. If we might hazard our own opinion, we should say that the truth lies between them, and that it has been found by the moderate men of both parties, who, while they make use of different language, seem to us to have the same sentiments. That all mankind really sinned in Adam, and are on that account liable to most grievous torments in soul and body, without intermission, in hell fire for ever, is a doctrine which cannot be reconciled to our natural notions of God. On the other hand, if human nature was not somehow debased by the fall of our first parents, it is not easy to account for the numberless phrases in scripture which certainly seem to speak that language, or for the very general opinion of the Pagan philosophers and poets respecting the golden age and the degeneracy of man. Cicero, in a quotation preserved by St Augustine from a work that is now lost, has these remarkable words, "*Homo non ut a matre sed ut a noverca natura editus est in vitam corpore nudo, et fragili, et infirmo: animo autem anxio ad molestias, humili ad timores, molli ad labores, prono ad libidines; in quo tamen inest tanquam obrutus quidam divinus ignis ingenii et mentis*." Nor do we readily perceive what should induce the more zealous Arminians to oppose so vehemently this general opinion of the corruption of human nature. Their desire to vindicate the justice and goodness of God does them honour; but the doctrine of inherent corruption militates not against these attributes; for what we have lost in the first Adam has been amply supplied to us in the second; and we know from the highest authority that the duties required of us are in proportion to our ability, since we are told, that "unto whomsoever much is given, of him shall much be required."

SECT. IV. *View of Theology from the fall of Adam to the coming of Christ.*

WE have dwelt long on the original state of man, his introduction into the terrestrial paradise, the privileges to which he was there admitted, his forfeiture of those privileges, and the state to which he was reduced by transgressing the law of his Maker; but the importance of these events renders them worthy of all the attention that we have paid to them. They paved the way for the coming of Christ and the preaching of the gospel; and unless we thoroughly understand the origin of the gospel, we cannot have an adequate conception of its design. By contrasting the first with the second Adam, St Paul gives us clearly to understand, that one purpose for which Christ came into the world and suffered death upon the cross, was to restore to mankind that life which they had lost by the fall of their original progenitor. The preaching of the gospel therefore commenced with the first hint of such a restoration; and the promise given to Adam and Eve, that "the seed of the woman should bruise the head of the serpent," was as truly evangelical as these words of the apostle, by which we are

taught, that "this is a faithful saying and worthy of all acceptance, that Christ Jesus came into the world to save sinners*." The former text taken by itself is indeed obscure, and the latter is explicit; but both belong to the same system, for the scriptures contain but two covenants or dispensations of God to man, in which the whole race is included.

Christianity therefore is indeed very near as old as the creation; but its principles were at first obscurely revealed, and afterwards gradually developed under different forms as mankind became able to receive them, (see PROPHECY, n. 5, &c.). All that appears to have been at first revealed to Adam and Eve was, that by some means or other one of their posterity should in time redeem the whole race from the curse of the fall; or if they had a distinct view of the means by which that redemption was to be wrought, it was probably communicated to them at the institution of sacrifices, (see SACRIFICE). This promise of a future deliverer served to comfort them under their heavy sentence; and the institution of sacrifices, whilst it impressed upon their minds lively ideas of the punishment due to their transgression, was admirably calculated to prepare both them and their posterity for the great atonement which, in due time, was to take away the sins of the world.

Our first parents, after their fall, were so far from being left to fabricate a mode of worship for themselves by those innate powers of the human mind of which we daily hear so much and feel so little, that God was graciously pleased to manifest himself to their senses, and visibly to conduct them by the angel of his presence in all the rites and duties of religion. This is evident from the different discourses which he held with Cain, as well as from the complaint of that murderer of being hid from his face, and from its being said, that "he went out from the presence of the Lord and dwelt on the east of Eden." Nor does it appear that God wholly withdrew his visible presence, and left mankind to their own inventions, till their wickedness became so very great that his spirit could no longer strive with them. The infant state of the world stood in constant need of his supernatural guidance and protection. The early inhabitants of this globe cannot be supposed to have been able, with Moses*, to look up to him who is invisible, and perform a worship purely rational and spiritual. They were all tillers of the ground, or keepers of cattle; employed in cultivating and replenishing this new world; and, through the curse brought upon it by their forefather, forced, with him, to eat their bread "in the sweat of their brow." Man in such circumstances could have little leisure for speculation; nor has mere speculation, unless furnished with principles from another source, ever generated in the human mind adequate notions of God's nature or providence, or of the means by which he can be acceptably worshipped. Frequent manifestations, therefore, of his presence would be necessary to keep up a tolerable sense of religion among them, and secure obedience to the divine institutions; and that the Almighty did not exhibit such manifestations, cannot be inferred from the silence of that very short history which we have of those early ages. Adam himself continued 930 years a living monument of the justice and mercy of God; of his extreme hatred and abhorrence of sin, as well as of his love and long-suffering towards the sinner. He was very sensible how sin had entered into the world, and he could not but apprise his children of its author. He would at the same time inform them of the unity of God, and his dominion over the evil one; of the means by which he had appointed himself to be worshipped; and of his promise of future deliverance from the curse of the fall. Such information would produce a tolerable idea of the Divine Being,

* Vide D. Aug. lib. iv. contra Pelagium. Vide etiam M. Tull. Cicer. Concl.

Theology from the fall of Adam to the coming of Christ. * 1 Tim. i. 15.

132 Christianity may be said to have commenced with the fall.

133 Revelations frequent in the early ages of the world.

* Heb. xi. 23.

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ing, and afford sufficient motives to obey his will. The effects of it accordingly were apparent in the righteous family of Seth, who soon distinguished themselves from the posterity of Cain, and for their eminent piety were honoured with the appellation of *the sons of God*. Of this family sprang a person so remarkable for virtue and devotion, as to be exempted from Adam's sentence and the common lot of his sons; for after he had walked with God 300 years, and prophesied to his brethren, he was translated that he should not see death. Of this miraculous event there can be no doubt but that his contemporaries had some visible demonstration; and as the fate of Abel was an argument to their reason, so the translation of Enoch was a proof to their senses of another state of life after the present. To Adam himself, if he was then alive (s), it must have been a lively and affecting instance of what he might have enjoyed, had he kept his innocence; it must have been a comfortable earnest of the promised victory over the evil one; and have confirmed his hope, that when the head of the serpent should be completely bruised, he and his posterity would be restored to the favour of their Maker, and behold his presence in bliss and immortality.

134
Yet vice, and probably idolatry, soon became prevalent.

Notwithstanding this watchful care of God over his fallen creature man, vice, and probably idolatry, spread through the world with a rapid pace. The family of Seth married into that of Cain, and adopted the manners of their new relations. Rapine and violence, unbounded lust and impurity of every kind, prevailed universally; and when those giants in wickedness had filled the earth with tyranny, injustice, and oppression; when the whole race was become entirely carnal—God, after raising up another prophet to give them frequent warnings of their fate for the space of 120 years, was at length obliged, in mercy to themselves as well as to the succeeding generations of men, to cut them off by a general deluge. See DELUGE.

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Pure religion for some time after the flood;

Thus did God, by the spirit of prophecy, which is by some supposed to have been hereditary in the heads of families; by frequent manifestations of his own presence; and by uninterrupted tradition—make ample provision for the instruction and improvement of the world for the first 1600 years. After the deluge he was pleased to converse again with Noah, and make in his person a new and extensive covenant with mankind. (see PROPHECY, n° 11.). Of his power, justice, and goodness; of his supreme dominion over the earth and the heavens; of his abhorrence of sin, and his determination not to let it go unpunished—that patriarch and his family had been most awfully convinced; nor could they or their children, for some time, want any other argument to enforce obedience, fear, and worship. The sons of Noah were an 100 years old when the deluge overwhelmed the earth. They had long conversed with their ancestors of the old world, had frequented the religious assemblies, observed every Sabbath day, and been instructed by those who had seen Adam. It is therefore impossible that they could be ignorant of the creation of the world, of the fall of man, or of the promise of future deliverance from the consequences of that fall; or that they could offer their sacrifices, and perform the other rites of the instituted worship, without looking forward with the eye of faith to that deliverance seen, perhaps obscurely, through their typical oblations.

In this state of things, with the awful remembrance of the deluge continually present to their minds, religion might

for some time be safely propagated by tradition. But when Theology by degrees mankind corrupted that tradition in its most essential parts; when, instead of the one Supreme God, they set up several orders of inferior deities, and worshipped all the host of heaven; when, at the same time they were uniting under one head, and forming a universal empire under the patronage of the Sun their chief divinity (see BABEL)—God saw it necessary to disperse them into distinct colonies, by causing such discord among them as rendered it impossible for any one species of idolatry to be at once universally established.

136
Idolatry, however, the cause of the dispersion from Babel.

After this dispersion, there is reason to believe that particular revelations were vouchsafed wherever men were disposed to regard them. Peleg had his name prophetically given him from the dispersion which was to happen in his days; and not only his father Eber, but all the heads of families mentioned from Noah to Abraham, are with much plausibility supposed to have had the spirit of prophecy on many occasions. Noah was undoubtedly both priest and prophet; and living till within two years of the birth of Abraham, or, according to others, till that patriarch was near 60 years old, he would surely be able to keep up a tolerable sense of true religion among such of his descendants as sojourned within the influence of his doctrine and example. His religious son Shem, who lived till after the birth of Isaac, could not but preserve in tolerable purity the faith and worship of the true God among such of his own descendants as lived in his neighbourhood.

But though the remains of true religion were thus preserved among a few righteous men, idolatry, with its inseparable attendants, unnatural lusts and cruel superstition (r), had in a short time prevailed so far among the sons of Noah, that God, in his infinite wisdom, saw it expedient not only to shorten the lives of men, but also to withdraw his presence from the generality, who had thus rendered themselves unworthy of such communications; and to select a particular family, in which his worship might be preserved pure amidst the various corruptions that were overspreading the world. With this view Abraham was called; and after many remarkable trials of his faith and constancy, admitted to a particular intimacy and friendship with his Maker. God entered into a peculiar covenant with him, engaging to be his present guide, protector, and defender; to bestow all temporal blessings upon him and his seed; and to make some of those seed the instruments of conveying blessings of a higher kind to all the nations of the earth.

137
The call of Abraham was

It was doubtless for his singular piety that Abraham was fixed upon to be the parent of that people, who should preserve the knowledge of the unity of God in the midst of an idolatrous and polytheistic world; but we are not to imagine that it was for his sake only that all this was done, or that his less worthy descendants were by the equal Lord of all treated with partial fondness for the virtues of their ancestor; it was for the benefit of mankind in general that he was called from his country, and from his father's house, that he might preserve the doctrine of the Divine unity in his own family, and be an instrument in the hand of Providence (and a fit one he was) to convey the same faith to the nations around him. Accordingly, we find him distinguished among the neighbouring princes, and kings reproved for his sake; who being made acquainted with his prophetic character, desire his intercession with God. History tells us of his conversing on the subject of religion with the most learned

138
To prevent the universal spreading of idolatry.

(s) According to the Samaritan chronology, he was alive; according to the Hebrew, he had been dead 57 years.

(r) See the effects of idolatry well described in the Apocryphal book of Wisdom, chap. xiv.

Theology ed Egyptians, who appear to have derived from him or from the some of his descendants the rite of circumcision, and to fall of A- have been for a while stopt in their progress towards the dam to the last stage of that degrading idolatry which afterwards rendered their national worship the opprobrium of the whole earth, (see POLYTHEISM, n^o 28). We are informed

* See Af-
atic Re-
searches and
Newt.
Chron.

that his name was had in the greatest veneration all over the East; that the Magians, Sabians, Persians, and Indians, all glory in him as the great reformer of their respective religions: and to us it appears extremely probable, that not only the Brachmans, but likewise the Hindoo god Brahma*, derive their names from the father of the faithful. As he was let into the various counsels of the Almighty, and taught to reason and reflect upon them; as he was fully apprised of the overthrow of Sodom and Gomorrah, with the particular circumstances of that miraculous event; and as he had frequent revelations of the promised Redeemer, whose day he longed earnestly to see, and seeing it was glad—there can be no doubt but that he and his family took care to propagate these important doctrines in every nation which they visited; for the only reason which we can conceive for his being made to wander from place to place was, that different people might be induced to inquire after his profession, his religion, and his hopes.

But though the Supreme Being was pleased to manifest himself in a more frequent and familiar manner to Abraham, he by no means left the rest of the world without sufficient light. Lot professed the true religion in the midst of Sodom. In Canaan we meet with Melchizedeck, king and priest of the most high God, who blessed Abraham, and to whom that patriarch himself did homage. Abimelech king of Gerar receiving an admonition from the Lord, immediately paid a due regard to it; and the same sense of religion and virtue descended to his son. Laban and Bethuel acknowledged the Lord, and the former of them was even favoured with a vision. In Arabia, we find Job and his three friends, all men of high rank, entering into the deepest disquisitions in theology; agreeing about the unity, omnipotence, and spirituality of God; the justice of his providence, with other fundamental articles of true religion; and mentioning divine inspiration or revelation as a thing not uncommon in their age and country* (v). Balaam appears to have been a true prophet; and as he was unquestionably a man of bad morals, the natural inference is, that the gift of prophecy was then, as afterwards, bestowed on individuals, not for their own sakes, but for the sake of the public; and that, as in “every nation, he who feareth God and worketh righteousness is accepted of him;” so in those early ages of the world, when mankind were but children in religious knowledge, they were blessed with the light of divine revelation wherever they were disposed to make a proper use of it.

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A second
purpose for
which A-
braham was
called.

Very few, however, appear to have had this disposition; and therefore God was pleased to adopt Abraham and part of his posterity as the race from which the great Redeemer was to spring, to train them up by degrees in suitable notions of their Creator, and gradually to open up to them, as they were able to receive it, the nature of that dispensation under which “all the nations of the earth were to be blessed in the patriarch’s seed, (see PROPHECY, n^o 13). For this purpose, he held frequent correspondence with

them; and to strengthen and confirm their faith, to fix and preserve their dependence on the one God of heaven and earth, he daily gave them new promises, each more magnificent than that which preceded it. He blessed Isaac, miraculously increased his substance, and soon made him the envy of the neighbouring princes. He foretold the condition of his two sons, renewed the promise made to Abraham, and blessed the adopted son Jacob, with whom he condescended to converse as he had conversed with Abraham and Isaac; renewing to him the great promise; bestowing upon him all kinds of riches; and impressing such terror upon all the cities which were round about him as prevented them from hurting either him or his family.

All this was indeed little enough to keep alive even in the mind of Jacob a tolerable sense of duty and dependence on his Creator. After the first vision he is surprised, and hesitates, seeming inclined to make a kind of stipulation with his Maker. “If (says he) God will be with me, and will keep me in this way that I go, and will give me bread to eat, and raiment to put on, so that I come again to my father’s house in peace, *then* shall the Lord be my God ||.” It appears not to have been till after many such revelations, blessings, and deliverances, and being reminded of the vow which on this occasion he had vowed, that he set himself in good earnest to reform the religion of his own family, and to drive out from it all strange gods*. So little able, in that age, were the boasted powers of the human mind to preserve in the world just notions of the unity of the Godhead, that we see there was a necessity for very frequent revelations, to prevent even the best men from running headlong into polytheism and idolatry.

Thus was God obliged to treat even with the patriarchs themselves, by way of positive covenant and express compact; to promise to be their God if they would be his people; to give them a portion of temporal blessings as introductory to future and spiritual ones; and to engage them in his service by immediate rewards, till they could be led on to higher views, and prepared by the bringing in of a better hope to worship him in spirit and in truth. With regard to what may be called the *theory* of religion, mankind were yet scarcely got out of their childhood. Some extraordinary persons indeed occasionally appeared in different countries, such as Enoch, Noah, Abraham, and Job, with many others, who had a more enlarged prospect of things, and entertained more worthy sentiments of the divine dispensations and of the ultimate end of man; but these were far superior to the times in which they lived, and appear to have been providentially raised up to prevent the savage state and savage idolatry from becoming universal among men. See SAVAGE.

The worship which was practised by those holy men appears to have consisted principally of the three kinds of sacrifice mentioned elsewhere (see SACRIFICE); to which were doubtless added prayers and praises, with the more valuable oblation of pure hands and devout hearts. Such of them as looked forward to a future redemption, and had any tolerable notion of the means by which it was to be effected, as Abraham certainly had, must have been sensible that the blood of bulls and of goats could never take away sin, and that their sacrifices were therefore valuable only when they were offered in faith of that great promise, “which they,

3 M 2

having

(v) There are great disputes among the learned respecting the antiquity and the author of the *book* of Job, and whether it be a history of events, or a poem which has its foundation in history. All sober men, however, are agreed, that there really was such a *person* as Job, eminent for patience under uncommon sufferings; and that he was of very remote antiquity. The LXX. give us the names of his father and mother, and say that he was the fifth from Abraham.

Theology having seen it afar off, were persuaded of, and embraced; and confessed that they were strangers and pilgrims upon earth." Theology from the fall of Adam to the coming of Christ.

That such persons looked for "a better country, even a heavenly one," in a future state, cannot be questioned; for they knew well how sin and death had entered into the world, and they must have understood the promise made to their original progenitor, and repeatedly renewed to themselves, to include in it a deliverance at some period from every consequence of the first transgression. They were to all intents and purposes Christians as well as we. They indeed placed their confidence in a Redeemer, who in the fulness of time was to appear upon earth, while we place ours in a Redeemer that has been already manifested; they expressed that confidence by one mode of worship, we express it by another; but the patriarchal worship had the same end in view with the Christian—the attainment of everlasting life in heaven.

142
Of a future Redeemer;

143
Such faith, however, not general.

The generality of men, however, appear not, in the early age of which we now write, to have extended their views beyond the present life. From the confused remains of ancient tradition, they acknowledged indeed some superior power or powers, to whom they frequently applied for direction in their affairs; but in all probability it was only for direction in temporal affairs, such as the cultivation of the ground, or their transactions with each other. In the then state of things, when no part of the world was overstocked with inhabitants, and when luxury with its consequences were everywhere unknown, virtue and vice must have produced their natural effects; and the good man being happy here, and the wicked man miserable, reason had no data from which to infer the reality of a future state of rewards and punishments. Those who were blessed with the light of revelation undoubtedly looked forward to that state with a holy joy; but the rest worshipped superior powers from worldly motives. How many of those powers there might be, or how far their influence might reach, they knew not. Uncertain whether there be one Supreme Governor of the whole world, or many co-ordinate powers presiding each over a particular country, climate, or place—gods of the hills and of the valleys, as they were afterwards distinguished—they thought that the more of these they could engage in their interest the better. Like the Samaritans therefore, in after times, they sought, wherever they came, the "manners of the god of the land," and served him, together with their own gods.

144
The purpose for which the Israelites were made to sojourn in Egypt.

Thus was the world ready to lose all knowledge of the true God and his worship, had not he been graciously pleased to interpose, and take effectual care to preserve that knowledge in one nation, from which it might be conveyed to the rest of mankind at different times, and in greater or less degrees, as they should be capable of receiving it. To this purpose he made way for the removal of Jacob and his family to one of the most improved and polished countries of the world; and introduced them into it in a manner so advantageous, as to give them an opportunity of imparting much religious knowledge to the natives. The natives, however, were gross idolaters; and that his chosen people might be as far as possible from the contagion of their example, he placed them upon the borders of Egypt, where, though they multiplied exceedingly, they were by their very occupation still kept a separate people, and must have been rendered, by a long and severe oppression, in a great degree averse from the manners and religion of their neighbours. This aversion, however, seems to have gradually become less and less; and before they were miraculously redeemed from their house of bondage, they had certainly lost all correct notions of the unity of God, and the nature of his worship,

† Gen. xlvii. 33-34.

and had adopted the greater part of the superstitions of their task-masters. Of this we need no other proof than what is implied in the words of Moses*, when he said unto God, "Behold, when I come unto the children of Israel, and say unto them, the God of your fathers hath sent me unto you; and they shall say unto me, WHAT IS HIS NAME? what shall I say unto them?" Had not the destined lawgiver of the Hebrews been aware that his countrymen had adopted a plurality of gods, this difficulty could not have occurred to him; for names are never thought of but to distinguish from each other beings of the same kind; and he must have remembered, that in Egypt, where the multitude of gods was marshalled into various classes, the knowledge of their names was deemed of great importance. This we learn likewise from Herodotus, who informs us*, that the Pelasgi, after settling in Greece, thought it necessary to consult the oracle of Dodona, whether it would be proper to give to their own gods the names of the Egyptian divinities? and that the oracle, as might have been supposed, assured them that it would. Indeed the Hebrews during their residence in Egypt had acquired such an attachment to the idolatrous worship of the country, that it appears never to have left them entirely till many ages afterwards, when they were carried captive into Babylon, and severely punished for their repeated apostacies; and so completely were they infatuated by these superstitions at the era of their exodus, that, as the prophet Ezekiel informs us*, they rebelled against God, and would not cast away their abominations, or forsake the idols of Egypt, even in the very day that the hand of Omnipotence was lifted up to bring them forth of that land in which they had been so long and so cruelly oppressed. In such a state of things, to have suffered them to remain longer in Egypt, could have served no good purpose; and therefore to fulfil the promise which he had given to Abraham, God determined to deliver them out of the hand of the Egyptians by means which should convince both them and their offspring of his own supremacy over heaven and earth.

As Moses was the person appointed to deliver God's message to Pharaoh, and to demand of him leave for the Israelites to go three days journey into the wilderness to serve the God of their fathers, it was necessary that he should be endowed with the power of making miracles to evince the reality of his divine mission. Without a conviction that his claims were well-founded, neither Pharaoh nor his own countrymen could reasonably have been expected to listen to the proposals of a man who, though blessed in his youth with a princely education, had come directly on his embassy from the humble employment of a shepherd, which he had for many years exercised in the country of Midian. To prove that he was really sent by God, any visible and undoubted controul of the laws of nature would have been abundantly sufficient; but he was to prove not only this truth, but also the unity of the Divine nature; and the miracles which he was directed to work were executions of judgments against the very gods of Egypt*.

When Pharaoh first turned a deaf ear to his request, though enforced by the conversion of a rod into a serpent, at the command of Jehovah he smote with the same rod upon the waters in the river, which were instantly converted into blood, and occasioned the death of all the fishes that swam in them. To any people this miracle would have been a proof of Divine agency; but it was in a particular manner calculated to open the eyes of the blind and infatuated Egyptians, who considered the Nile as one of their greatest gods, and all the fishes that it contained as subordinate divinities. They called that noble river sometimes *Sirius*, sometimes *Osiris*, sometimes *Canopus* (see CANOPUS), and not

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Moses appointed to bring them out of Egypt.

* Exod. xii. 12.

147
The propriety of the miracles which he wrought.

Theology not unfrequently *Ὠκεανός* (x); and adored it as the parent of all their deities. What then must the people have thought when they found their most revered god, at the command of a servant of Jehovah, converted into blood, and all his sacred offspring into stinking carcases? To conceive their

consternation, if it can be conceived, the reader must remember, that the Egyptian priests held blood in the utmost abhorrence, as a thing of which the very touch would deeply pollute them, and require immediate and solemn expiation. The same sacred river was a second time polluted, when it sent forth frogs, which covered all the land of Egypt, and died in the houses, in the villages, and in the fields; thus rendering it impossible for the people to avoid the touch of dead bodies, though from every such contact they believed themselves to contract an impurity, which, in the case before us, must have been the more grievous, that in the whole country there was not left a pool of uninfected water to wash away the stain.

The third plague inflicted upon the Egyptians was, the converting of the dust of the land into lice, upon man and upon beast, throughout the whole kingdom. To see the propriety of this miracle as a judgment upon their idolatry, we must recollect their utter abhorrence of all kinds of vermin, and their extreme attention to external purity above every other people perhaps that has hitherto existed on the face of the earth. Upon this head they were more particularly solicitous when about to enter the temples of their gods; for Herodotus informs us, that their priests wore linen raiment only, and shaved off every hair from their heads and bodies, that there might be no *louse* or other detestable object upon them when performing their duty to the gods. This plague therefore, while it lasted, made it impossible for them to perform their idolatrous worship, without giving such offence to their deities as they imagined could never be forgiven. Hence we find, that on the production of the lice, the priests and magicians perceived immediately from what hand the miracle had come, and exclaimed, "This is the finger of God!" The fourth plague seems to have been likewise acknowledged to be the finger of God, if not by the magicians, at least by Pharaoh; for in a fit of terror he agreed that the Israelites should go and serve the Lord. That he was terrified at the swarms of flies which infested the whole country, except the land of Goshen, will excite no wonder, when it is known that the worship of the fly originated in Egypt; whence it was carried by the Caphtorim to Palestine; by the Phœnicians to Sidon, Tyre, and Babylon; and from these regions to other parts of the world. The denunciation of this plague was delivered to Pharaoh early in the morning, when he was on the banks of the Nile, probably paying his accustomed devotion to his greatest god; and when he found himself and his people tormented by a swarm of subordinate divinities, who executed the judgment of Jehovah in defiance of the power of the supreme *numen* of Egypt, he must have been convinced, had any candour remained in his mind, that the whole system of his superstition was a mass of absurdities, and that his gods were only humble instruments at the disposal of a Superior Power. He was not, however, convinced; he was only alarmed, and quickly relapsed into his wonted obstinacy. The fifth plague therefore, the murrain among the cattle, brought death and destruction upon his most revered gods themselves. Neither Osiris, nor Isis, nor Ammon, nor Pan, had power to save his brute representatives. The sacred bull, and heifer, and ram, and goat, were

carried off by the same malady which swept away all the other herds of deities, these *dii stercorei*, who lived on grass and hay. The impression of this punishment must have been awful upon the minds of the Egyptians, but perhaps not equal to that which succeeded it.

In Egypt there were several altars on which human sacrifices were offered; and from the description of the persons qualified to be victims, it appears that those unhappy beings must have been foreigners, as they were required to have bright hair and a particular complexion. The hair of the Israelites was much brighter than that of the Egyptians, and their complexions fairer; and therefore there can be little doubt but that, during their residence in Egypt, they were made to furnish the victims demanded by the bloody gods. These victims being burnt alive on a high altar, and thus sacrificed for the good of the nation, their ashes were gathered together by the priests, and scattered upwards in the air, that a blessing might be entailed on every place to which an atom of this dust should be wafted. Moses too, by the direction of the true God, took ashes of the furnace, probably of one of those very furnaces in which some of his countrymen had been burnt, and sprinkling them towards heaven in the sight of Pharaoh, brought boils and blains upon all the people, of so malignant a nature, that the magicians and the other ministers of the medical gods, with which Egypt abounded beyond all other countries, could not themselves escape the infection.

The powers of darkness were thus foiled; but the heart of the monarch was still hardened. Destruction was therefore next brought upon him and his country by the elements, which were among the earliest idol deities not only of the Egyptians, but of every other polytheistic nation. "The Lord rained hail upon the land of Egypt; so that there was hail, and fire mingled with the hail, such as there was none like it in all the land of Egypt since it became a nation. And the hail smote throughout all the land of Egypt all that was in the field, both man and beast; and the hail smote every herb of the field, and broke every tree of the field." This was a dreadful calamity in itself; and the horror which it excited in the minds of the people must have been greatly aggravated by the well-known fact, that Egypt is blessed with a sky uncommonly serene; that in the greatest part of it rain has never been seen at any other time since the creation of the world; and that a slight and transient shower is the utmost that in the ordinary course of nature falls anywhere throughout the country. The small quantity of vegetables which was left undestroyed by the fire and the hail was afterwards devoured by locusts, which by a strong east wind were brought in such numbers from Arabia, where they abound at all times, that they covered the whole face of the earth, and did eat every herb of the land, and all the fruit of the trees, so that there remained not any green thing in the trees or in the herbs of the field through all the land of Egypt.

The ninth plague which the obstinacy of Pharaoh brought upon his country, whilst it severely punished the Egyptians for their cruelty to the Hebrews, struck at the very foundation of all idolatry. We have elsewhere shown, that the first objects of idolatrous worship were the contending powers of light and darkness (see POLYTHEISM); and that the benevolent principle, or the power of light, was everywhere believed to maintain a constant superiority over the power of darkness. Such was the faith of the ancient Persians; and such, as a very learned writer has lately proved, was like-

Theology from the fall of Adam to the coming of Christ.

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To evince
the vanity
of idol
worship.

(x) Whence came the Greek word *Ὠκεανός*, the ocean.

Theology
from the
fall of A-
dam to the
coming of
Christ.

wife the faith of the earlier Egyptians. It was therefore with wisdom truly divine, that God, to show the vanity of their imaginations, brought upon those votaries of light, who fancied themselves the offspring of the sun, a preternatural darkness, which, for three days, all the powers of their supreme deity and his subordinate agents could not dispel.

The tenth and last plague brought upon this idolatrous people was more universally and severely felt than any which had preceded it. It was likewise, in some sense, an instance of the *lex talionis*, which requires an eye for an eye, and a tooth for a tooth, &c. Moses was commanded, at his first interview with Pharaoh, to say, "Thus saith the Lord, Israel is my son, even my first-born. Let my son go that he may serve me: and if thou refuse to let him go, behold, I will slay thy son, even thy first-born." Before this threat was put in execution, every attempt was made to soften the hardened heart of the obstinate tyrant. The waters of his sacred river were turned into blood, and all the fishes that it contained slain; frogs were brought over all the land to pollute the people; the ministers of religion were rendered so impure by vermin, that they could not discharge their wonted offices; the animals most revered as gods, or emblems of gods, were cut off by a murrain; the elements, that were everywhere worshipped as divinities, carried through the land a devastation, which was completed by swarms of locusts; the ashes from the sacred furnace, which were thought to convey blessings whithersoever they were wafted, were made to communicate incurable diseases; a thick and preternatural darkness was spread over the kingdom, in defiance of the power of the great Osiris; and when the hearts of the people and their sovereign continued still obdurate, the eldest son in each family was slain, because they refused to let go Israel, God's first-born. From this universal pestilence the Israelites were preserved by sprinkling the doorposts of their houses with the blood of one of the animals adored in Egypt; a fact which, as it could not be unknown to Pharaoh or his subjects, ought to have convinced that people of the extreme absurdity of their impious superstitions. This effect it seems not to have had; but the death of the first-born produced the deliverance of the Hebrews; for when it was found that there was not a house where there was not one dead, "Pharaoh called for Moses and Aaron by night, and said, Rise up, and get you forth from among my people, both you and the children of Israel; and bless me also. And the Egyptians were urgent upon the people, that they might send them out of the land in haste; for they said, We be all dead men (y)." The wonted obstinacy of the monarch indeed very soon returned; and his subjects, forgetting the loss of their children, joined with him in a vain attempt to bring back to bondage the very people whom they had been thus urgent to send out of the land; but their attempt was defeated by Jehovah, and all who engaged in it drowned in the Red Sea.

The God of Israel having thus magnified himself over the Egyptians and their gods, and rescued his people from bondage by such means as must not only have struck terror and astonishment into the whole land, but also have spread his name through all the countries which had any communica-

tion with that far-famed nation, proceeded to instruct and exercise the Hebrews for many years in the wilderness. He inculcated upon them the unity of the Godhead; gave them statutes and judgments more righteous than those of any other nation; and by every method consistent with the freedom of moral agency guarded them against the contagion of idolatry and polytheism. He sent his angel before them to keep them in the way, took upon himself the office of their supreme civil governor, and by his presence directed them in all their undertakings. He led them with repeated signs and wonders through the neighbouring nations, continued to try and discipline them till they were tolerably attached to his government and established in his worship, and introduced them into the Promised Land when its inhabitants were ripe for destruction. At their entrance into it, he gave them a summary repetition of their former laws, with more such ordinances, both of a ceremonial and moral kind, as were both suited to their temper and circumstances, as well as to prefigure, and by degrees to prepare them for, a more perfect dispensation under the Messiah.

The Jewish law had two great objects in view; of which the first was to preserve among them the knowledge of the true God, a rational worship springing from that knowledge, and the regular practice of moral virtue; and the second was to fit them for receiving the accomplishment of the great promise made to their ancestors, by means analogous to those which a schoolmaster employs to fit his pupils for discharging the duties of maturer years. Every thing in that law peculiar to itself, its various ceremonies, modes of sacrificing, the sanctions by which it was enforced, and the theocratic government by which it was administered, had a direct tendency to promote one or other of these ends; and keeping these ends in view, even the minutest laws, at which impious ignorance has affected to make itself merry, will be discovered by those who shall study the whole system, and are at the same time acquainted with the genius of ancient polytheism, to have been enacted with the most consummate wisdom.

It is not easy for us, who have been long blessed with the light of revelation, and who have cultivated our minds by the study of the sciences, to conceive the propensity of all nations, in that early age of the world, to the worship of false gods, of which they were daily adding to the number. It is indeed probable, from many passages of Scripture, as well as from profane authors of the greatest antiquity, that one supreme *numen* was everywhere acknowledged; but he was considered as an extramundane being, too highly exalted to concern himself with the affairs of this world, the government of which, it was believed, he had delegated to various orders of subordinate deities. Of those deities, some were supposed to have the charge of one nation and some of another. Hence it is, that we read of the gods of Egypt, the gods of the Amorites, and the gods of the different nations round about Palestine. None of those nations denied the existence of their neighbour's gods; but all agreed, that while the Egyptians were the peculiar care of Osiris and Isis, the Amorites might be the favourites of Moloch, the Phœnicians of Cronus, and the Philistines of Dagon; and they

(y) For this account of the plagues of Egypt, we are indebted to the very valuable *Observations* on the subject lately published by *Mr Bryant*. We have not quoted the authorities by which the learned and pious author supports his opinions; because it is to be hoped, that for a fuller account of these important transactions the reader will have recourse to his work, of which we have given only a very brief abstract. For much of the preceding parts of this section, we acknowledge our obligations to the late Bishop Law's admirable discourse on the *Several Dispensations of Revealed Religion*.

Theology from the fall of Adam to the coming of Christ. they had no objection occasionally to join with each other in the worship of their respective tutelary deities. Nay, it was thought impiety in foreigners, while they sojourned in a strange country, not to sacrifice to the gods of the place. Thus Sophocles makes Antigone say to her father, that a stranger should both venerate and abhor those things which are venerated and abhorred in the city where he resides; and another author*, who, though comparatively late, drew much of his information from ancient writings, which are now lost, assures us, that this complaisance proceeded from the belief that the "several parts of the world were from the beginning distributed to several powers, of which each had his peculiar allotment and residence."

* *Cælius apud Aug.*

* *Erod. xix. 5.*

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Purpose of their separation from other people.

† *1 Sam. xvi. 19.*

§ *Erod. xxxiii. 16.*

152
Of their theocratic government.

From this notion of local divinities, whose power or partial fondness was confined to one people, the Israelites, at their exodus from Egypt, appear not to have been free (z). Hence it is, that when the true God first tells them, by their leader Moses*, that if they would obey his voice indeed and keep his covenant, then they should be a PECULIAR TREASURE to him above all people: to prevent them from supposing that he shared the earth with the idols of the heathen, and had from partial fondness chosen them for his portion, he immediately adds, for ALL THE EARTH IS MINE. By this addition he gave them plainly to understand that they were chosen to be his peculiar treasure for some purpose of general importance; and the very first article of the covenant which they were to keep was, that they should have no other gods but him. So inveterate, however, was the principle which led to an intercommunity of the objects of worship, that they could not have kept this article of the covenant but in a state of separation from the rest of mankind†; and that separation could neither have been effected nor continued without the visible providence of the Almighty watching over them as his peculiar treasure. This we learn from Moses himself, who, when interceding for the people after their idolatrous worship of the golden calf, and intreating that the presence of God would still accompany them, adds these words§: "For wherein shall it be known here that I and thy people have found grace in thy sight? Is it not in that THOU GOEST WITH US? So shall we be SEPARATED, I and thy people, from all the people that are upon the face of the earth." Upon this separation every thing depended; and therefore to render it the more secure, Jehovah, who in compliance with their prejudices had already assumed the appellation of their tutelary God, was graciously pleased to become likewise their supreme Magistrate, making them a "kingdom of priests and a holy nation," and delivering to them a digest as well of their civil as of their religious laws.

The Almighty thus becoming their King, the government of the Israelites was properly a THEOCRACY, in which the two societies, civil and religious, were of course incorporated. They had indeed after their settlement in the Promised Land, at first, temporary judges occasionally raised up; and afterwards permanent magistrates called kings, to

lead their armies in war, and to give vigour to the administration of justice in peace: but neither those judges nor those kings could abrogate a single law of the original code, or make the smallest addition to it but by the spirit of prophecy. They cannot therefore be considered as supreme magistrates, by whatever title they may have been known; for they were to go out and come in at the word of the priests, who were to ask counsel for them of the Lord, and with whom they were even associated in all judicial proceedings, as well of a civil as of a spiritual nature*. Under any other than a theocratic government the Hebrews could not have been kept separate from the nations around them; or if they could, that separation would not have answered the great purpose for which it was established. "The people, on their leaving Egypt, were sunk into the lowest practices of idolatry. To recover them by the discipline of a separation, it was necessary that the idea of God and his attributes should be impressed upon them in the most sensible manner. But this could not be commodiously done under his character of God of the universe: under his character of King of Israel, it well might. Hence it is, that we find him in the Old Testament so frequently represented with affections analogous to human passions. The civil relation in which he stood to the Israelites made such a representation natural; the grossness of their conceptions made the representation necessary; and the guarded manner in which it was always qualified prevented it from being mischievous*." Hence too it is, that under the Mosaic dispensation, idolatry was a crime of state, punishable by the civil magistrate. It was indeed high treason, against which laws were enacted upon the justest principles, and carried into effect without danger of error. Nothing less indeed than penal laws of the severest kind could have restrained the violent propensity of that headstrong people to worship, together with their own God, the gods of the Heathen. But penal laws enacted by human authority for errors in religion are manifestly unjust; and therefore a theocratic government seems to have been absolutely necessary to obtain the end for which the Israelites were separated from the surrounding nations.

It was for the same purpose of guarding them against idolatry, and preventing all undue communications with their Heathen neighbours, that the ritual law was given, after their presumptuous rebellions in the wilderness. Before the business of the golden calf, and their frequent attempts to return into Egypt, it seems not to have been the Divine intention to lay upon them a yoke of ordinances; but to make his covenant depend entirely upon their duly practising the rite of circumcision; observing the festivals instituted in commemoration of their deliverance from bondage, and other signal services vouchsafed them; and keeping inviolate all the precepts of the decalogue (A), which, if they had done, they should have even lived in them*. But after their repeated apostacies, and impious wishes to mix with the surrounding nations, it was necessary to subject them

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* *Num. xxvii. 21. and Deut. xvii. 8-13.*

* *Warburton's Div. Leg. b. v. sec. 2.*

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And of the ritual law.

* *Divine Leg. b. iv. sec. 6.*

(z) It is not indeed evident that they had got entirely quit of this absurd opinion at a much later period. Jephtha, one of their judges, who, though half paganized (as Warburton observes) by a bad education, had probably as correct notions of religion as an ordinary Israelite, certainly talked to the king of Ammon as if he had believed the different nations of the earth to be under the immediate protection of different deities: "Wilt not thou (says he) possess that which Chemosh thy God giveth thee to possess? So whomsoever the Lord our God shall drive out from before us, them will we possess. (Judges xi. 24)."

(A) Of these precepts we think it not necessary, in an abstract so short as this, to waste the reader's time with a formal and laboured defence. To the decalogue no objection can be made by any man who admits the obligations of natural religion; for, except the observation of the Sabbath-day, it enjoins not a single duty which does not by the confession of all men result from our relations to God, ourselves, and our fellow-creatures.

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them to a multifarious ritual, of which the ceremonial parts were solemn and splendid, fitted to engage and fix the attention of a people whose hearts were gross; to inspire them with awful reverence, and to withdraw their affections from the pomp and pageantry of those idle superstitions which they had so long witnessed in the land of Egypt. To keep them warmly attached to their public worship, that worship was loaded with operose and magnificent rites, and so completely incorporated with their civil polity as to make the same things at once duties of religion and acts of state. The service of God was indeed so ordered as to be the constant business as well as entertainment of their lives, supplying the place of all other entertainments; and the sacrifices which they were commanded to offer on the most solemn occasions, were of such animals as the Egyptians and other Heathens deemed sacred.

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Instanced
in their
sacrifices.

† Num. xix.

* Levit.
xvi.

|| Lev. ix.

§ Spencer
de Legibus
Heb. Rit.
lib. ii. cap.
4.

Thus a heifer without blemish was in Egypt held sacred to the goddess Isis, and actually worshipped as the representative of that divinity; but the same kind of heifer was by the ritual law of the Hebrews commanded to be burnt without the camp, as the vilest animal, and the water of separation to be prepared from her ashes †. The goat was by the Egyptians held in great veneration as emblematical of their ancient god Pan, and sacrifices of the most abominable kind were offered to the impure animal (see PAN); but God, by his servant Moses, enjoined the Israelites to offer goats themselves as sacrifices for sin, and on one occasion to dismiss the live animal loaded with maledictions into the wilderness *. The Egyptians, with singular zeal, worshipped a calf without blemish as the symbol of Apis, or the god of fertility; and it appears from the book of Exodus, that the Israelites themselves had been infected with that superstition. They were, however, so far from being permitted by their Divine lawgiver to consider that animal as in any respect sacred, that their priests were commanded to offer for themselves a young calf as a sin-offering ||. No animal was in Egypt held in greater veneration than the ram, the symbol of their god Ammon, one of the heavenly constellations. It was therefore with wisdom truly divine, that Jehovah, at the institution of the passover, ordered his people to kill and eat a young ram on the very day that the Egyptians began their annual solemnities § in honour of that animal as one of their greatest gods; and that he enjoined the blood of this divinity to be sprinkled as a sign upon the two side-posts and upper door-post of the house in which he was eaten. Surely it is not in the power of imagination to conceive a ritual better calculated to cure the Israelites of their propensity to idol worship, or to keep them separate from the people who had first given them that propensity, than one which enjoined them to offer in sacrifice the very creatures which their superstitious masters had worshipped as gods. "Shall we (said Moses) sacrifice the abominations of the Egyptians before their eyes, and will they not stone us?"

But it was not against Egyptian idolatry only that the ritual law was framed: the nations of Syria, in the midst of whom the Israelites were to dwell, were addicted to many cruel and absurd superstitions, against which it was as necessary to guard the people of God as against the bruteworship of Egypt. We need not inform any reader of the books of Moses that those nations worshipped the sun and moon and all the host of heaven; or that it was part of their religion to propitiate their offended gods by occasionally sacrificing their sons and their daughters. From such worship and such sacrifices the Israelites were prohibited under the severest penalties; but we cannot consider that prohibition as making part of the ritual law, since it relates to practices impious and immoral in themselves, and therefore de-

clared to be abominations to the Lord. The Phœnicians, however, and the Canaanites, entertained an opinion that every child came into the world with a polluted nature, and that this pollution could be removed only by a lustral fire. Hence they took their new-born infants, and with particular ceremonies made them pass through the flame of a pile sacred to Baal or Moloch, the symbols of their great god the sun. Sometimes this purgation was delayed till the children had arrived at their tenth or twelfth year, when they were made either to leap through the flame, or run several times backwards and forwards between two contiguous sacred fires; and this lustration was supposed to free them from every natural pollution, and to make them through life the peculiar care of the deity in whose honour it was performed *. The true God, however, who would have no fellowship with idols, forbade all such purgations among his people, whether done by fires consecrated to himself or to the bloody deities of the Syrian nations. "There shall not be found (says he) among you any one that maketh his son or his daughter to pass through the fire †."

There are, in the Jewish law, few precepts more frequently repeated than that which prohibits the seething of a kid in its mother's milk ||; and there being no moral fitness in this precept when considered absolutely and without regard to the circumstances under which it was given, infidel ignorance has frequently thought fit to make it the subject of profane ridicule. But the ridicule will be borne by those who know that, among the nations round Judea, the feasting upon a kid boiled in its mother's milk was an essential part of the impious and magical ceremonies celebrated in honour of one of their gods, who was supposed to have been suckled by a she-goat. Hence, in the Samaritan Pentateuch, the text runs thus; "Thou shalt not seeth a kid in its mother's milk; for whoever does so, is as one who sacrifices an abominable thing, which offends the God of Jacob §." Another precept, apparently of very little importance, is given in these words: "Ye shall not round the corners of your heads, neither shalt thou mar the corners of thy beard *." But its wisdom is seen at once, when we know that at funerals it was the practice of many of the heathens, in that early period, to round the corners of their heads, and mar their beards, that by throwing the hairs they had cut off upon the dead body, or the funeral pile, they might propitiate the shade of the departed hero; and that in other nations, particularly in Phœnicia, it was customary to cut off all the hair of their heads except what grew upon the crown, which, with great solemnity, was consecrated either to the sun or to Saturn †. The unlearned Christian, if he be a man of reflection, must read with some degree of wonder such laws as these: "Thou shalt not sow thy vineyard with divers seeds, lest the fruit of thy seed which thou hast sown and the fruits of thy vineyard be defiled. Thou shalt not plow with an ox and an ass together. Thou shalt not wear a garment of divers sorts, or of woollen and linen together ‡." But his wonder will cease when he knows that all these were practices from which the Sabian idolaters of the east expected the greatest advantages. Their belief in magic and judicial astrology led them to imagine, that by sowing different kinds of corn among their vines they should propitiate the gods which were afterwards known in Rome by the names of Bacchus and Ceres; that, by yoking animals so heterogeneous as the ox and the ass in the same plough, they should by a charm secure the favour of the deities who presided over the affairs of husbandry; and that a garment composed of linen and woollen, worn under certain conjunctions of the stars, would protect its owner, his flocks, his herds, and his field, from all malign influences, and render him in the highest degree

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And in the
laws respect-
ing eating,
and drink-
ing, and
agriculture.

* Spencer,
lib. ii. cap.
13.

† Deut.

xvii. 10. xii.
29. and
Levit. xx.
2, &c.

|| Exod. xiii.
10. xxiv.
26. Deut.
xiv. 21.

§ Spencer,
lib. ii. cap.

* Levit.
xix. 27.

† Spencer,
lib. ii. cap.
18.

‡ Deut.
xii. 9, 10, 11.

Theology degree prosperous through the whole course of his life §. But magical ceremonies, of which the very essence seems to have consisted in uniting in one group or jumble things never brought together by nature, were always performed in order to render propitious good or evil demons (see MAGIC); and therefore such ceremonies, however unimportant in themselves, were in that age most wisely prohibited in the Mosaic law, as they naturally led those who were addicted to them to the worship of idols and impure spirits.

§ Spenser, lib. ii. cap. 30, 31, 33.

If the whole ritual of the Jewish economy be examined in this manner, every precept in it will be found to be directed against some idolatrous practice of the age in which it was given. It was therefore admirably calculated to keep the Israelites a separate people, and to prevent too close an intercourse between them and their Gentile neighbours. And their civil institutes, even those which appear the most trifling, were all contrived with the most consummate wisdom to promote the same end. The distinction made by their law between clean and unclean animals (see SLAVERY, n° 33.) rendered it impossible for them, without a breach of that law, to eat and drink with their idolatrous neighbours; their sacred and civil ceremonies being directly levelled against the Egyptian, Zabian, and Canaanitish superstitions, had a tendency to generate in their minds a keen contempt of those superstitions; and that contempt must have been greatly increased by their yearly, monthly, and daily sacrifices, of the very animals which their Egyptian masters had worshipped as gods.

136 The Mosaic laws enforced by temporal sanctions.

That these laws might have the fuller effect upon minds gross and carnal, they were all enforced by temporal sanctions. This was indeed the natural and even necessary consequence of the theocratic government established in Israel; for when God condescended to become their supreme civil magistrate, he of course engaged to execute, either immediately by himself, or by the medium of his viceregents the judges and the kings, all the offices included in such magistracy. Hence it is that Moses assured them, that if they would hearken to God's judgments, and keep them, and do them, they should be blessed above all people; threatening them at the same time with utter destruction if they should at all walk after other gods, and serve them, and worship them †. Nor were these temporal rewards and punishments held out only to the nation as a collective body; they were promised and threatened to every individual in his private capacity as the certain consequences of his obedience or disobedience. Every particular Hebrew was commanded to honour his father and mother, that it might go well with him, and that his days might be prolonged; whilst he who cursed his father or his mother was surely to be put to death. Against every idolater, and even against the wilful transgressor of the ceremonial law, God repeatedly declared that he would set his face, and would cut off that man from among his people: and that individuals, as well as the nation, were in this life actually rewarded and punished according to their deserts, has been proved by bishop Warburton with a force of evidence § which must carry conviction to every mind which his lordship's rude railings at some favourite system have not filled with prejudices against all his works. Indeed the Mosaic law, taken in its literal sense, holds out no other prospects to the Israelites than temporal happiness; such as, health, long life, peace, plenty, and dominion, if they should keep the covenant; and temporal misery, viz. disease, immature death, war, famine, want, subjection, and captivity, if they should break it. "See (says Moses), I have set before thee this day life and good, death and evil; in that I command thee this day to love the Lord thy God, to walk in his ways, and to keep his commandments, and his statutes, and his judgments, that

thou mayest live and multiply; and the Lord thy God shall bless thee in the land whither thou goest to possess it. But if thine heart turn away, so that thou wilt not hear, but shalt be drawn away, and worship other gods, and serve them; I denounce unto you this day, that ye shall surely perish, and that ye shall not prolong your days upon the land whither thou passest over Jordan to possess it." And elsewhere, having informed them that, upon their apostacy, their land should be rendered like Sodom and Gomorrah, he adds, that all men should know the reason of such barrenness being brought upon it, and should say, "Because they have forsaken the covenant of the Lord God of their fathers, which he made with them when he brought them forth out of the land of Egypt, the anger of the Lord was kindled against this land, to bring upon it all the curses that are written in this book †."

From this notorious fact, which hardly any man of letters will now dare to deny, some divines have concluded, we think rashly, that the ancient Israelites had no hope whatever beyond the grave; and that in the whole Old Testament there is not a single intimation of a future state. That many of the lowest vulgar, who could neither read nor write, were in this state of darkness, may be true; but it is impossible that such of them as understood the book of Genesis could be ignorant that death came into the world by the transgression of their first parents, and that God had repeatedly promised to redeem mankind from every consequence of that transgression. They must likewise have known that, before the deluge, Enoch was translated into heaven without tasting death; that afterwards Elijah had the same exemption from the common lot of humanity; and that, as God is no respecter of persons, every one who served him with the zeal and fidelity of these two prophets would, by some means or other, be made capable of enjoying the same rewards. The God of Abraham, Isaac, and Jacob, was not the God of the dead, but of the living.

In the earliest periods of their commonwealth, the Israelites could, indeed, only infer, from different passages of their sacred books, that there would be a general resurrection of the dead, and a future state of rewards and punishments; but from the writings of the prophets it appears, that before the Babylonish captivity that doctrine must have been very generally received. We shall not, in support of our opinion, quote the famous passage in the book of Job §, because it is not determined at what period that beautiful and sublime poem was admitted into the Jewish canon; but in the Psalms, and in the prophecies of Isaiah, Daniel, and Ezekiel, there are several texts which seem to us to prove, incontrovertibly, that, at the time when these inspired books were written, every Israelite who could read the scriptures must have had some hopes of a resurrection from the dead. We shall consider two of these texts, because they have been quoted by a very learned and valuable writer in support of an opinion the reverse of ours.

In a sublime song, composed with a view to incite the people to confidence in God, the prophet Isaiah has these remarkable words; "Thy dead men shall live; together with my dead body shall they arise. Awake and sing, ye that dwell in the dust; for thy dew is as the dew of herbs, and the earth shall cast out the dead †." We agree with bishop Warburton that these words are figurative, and that they were uttered to give the Israelites consolation in very disastrous times. The purpose of the prophet was to assure them, that though their community should, in Babylon, be as completely dissolved as a dead body reduced to dust, yet God would restore them to their own land, and raise that community again to life. This was indeed a prophecy only of a temporal deliverance; but as it is expressed in terms

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† Deut.

xxx. 15—19. xxxix. 25.

157 Whence it has been rashly inferred that the ancient Hebrews had no hope beyond the grave.

§ Chap. xix. verse 25, &c.

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This opinion is not founded.

† Chap. xxvi. 19.

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relating to the death and resurrection of man, the doctrine of a resurrection must then have been well known, and generally received, or such language would have been altogether unintelligible. No (says the bishop); that the language might be intelligible, it was only necessary that the Israelites should have distinct *ideas* of a resurrection from the dead, without knowing that the natural body is indeed to rise again; and as he thinks that such metaphorical expressions as this would have the greatest force where the doctrine of the resurrection was unknown, he concludes that it must have been unknown among the Israelites in the days of Isaiah*.

* Dio.

Leg. book vi. sect. 2.

Had there been no sacred books among the Israelites before this prophecy was uttered, his lordship's reasoning would have been at least plausible, if not conclusive; but that a people who knew how death had entered into the world, who believed that they were by some means or other to be freed from its sting, who, it is natural to suppose, often meditated upon the bruising of the serpent's head, and the nature of the blessing which all nations were to derive from the seed of Abraham, should form distinct *ideas* of a resurrection, and read this prophecy without believing that the natural body is *indeed to rise again*, we cannot possibly conceive. The very supposition is one of his lordship's most irreconcilable paradoxes; and it is a paradox which his system did not require him to support.

† Chap. xxxvii. 3.

The prophet Ezekiel, when the state of things was most desperate, is carried by the Spirit into a valley full of dry bones, and asked this question; "Son of man, can these bones live?" To which he answers; "O Lord God, thou knowest †;" an answer which the same learned prelate thinks the prophet could not have made, had he been brought up in the knowledge and belief of a resurrection from the dead. Our opinion is directly the reverse of that of his lordship, who seems to have mistaken the nature of this scenical representation. The prophet was not asked if *all* the dead would rise at the last day; but only if the particular bones *then* presented to him could live at *that time*, and while other bones were mouldering in corruption: and to such a question we cannot conceive any answer that a man brought up in the belief of a general resurrection could have given, but—"O Lord God, thou knowest." Had Ezekiel been a stranger to the doctrine of a general resurrection, or had he not believed that doctrine, he would doubtless have answered the question that was put to him in the negative; but convinced that *all* men are at *some* period to rise from the dead, "that every one may receive the things done in his body, according to that he hath done, whether it be good or bad," he very naturally said, that God alone knew whether the bones then exhibited to him in the valley would rise before the general resurrection.

But though the more intelligent and righteous Israelites certainly "all died in faith, and not having received the promises, but having seen them afar off, were persuaded of them and embraced them, confessing that they were strangers and pilgrims on earth, who desired a better country, that is, a heavenly one †," we are not to suppose that this heavenly desire arose from any thing taught in the law of Moses. That law, when taken by itself, as unconnected with prior and subsequent revelations, makes no mention whatever of a heavenly inheritance, which St Paul assures us ‡ was given 430 years before to Abraham by a promise which may be traced back to the first ray of comfort vouchsafed to fallen man in the sentence passed on the original deceiver. "Wherefore then served the law? It was added (says the apostle), because of transgressions, till the seed should come to whom the promise was made." The transgressions here alluded to were polytheism and idolatry, which, with their never-failing train of cruel and detestable vices, had overspread the whole world; and the primary intention of the law was to stem the torrent of these corruptions, for which we have seen it was admirably calculated; and, like a schoolmaster, to instruct the Israelites in the unity and worship of Jehovah, and thus by degrees bring them to Christ.

But though it is apparent that a future state of rewards and punishments made no part of the Mosaic dispensation, yet the law had certainly a spiritual meaning to be understood when the fulness of time should come. Every Christian sees a striking resemblance between the sacrifice of the paschal lamb, which delivered the Israelites from the destroying angel in Egypt, and the sacrifice of the Lamb of God, which taketh away the sin of the world. Indeed the whole ritual of sacrifice must have led the more intelligent of them to faith in a future sacrifice; by which, while the heel of the seed of the woman should be bruised, the head of the serpent should be completely crushed (see SACRIFICE); and as prophets were raised up from time to time, to prepare them for the coming of the Messiah, and to foretell the nature of his kingdom, there can be no doubt but that those inspired teachers would lay open to them, as far as was expedient, the temporary duration of the Mosaic law, and convince them that it was only the shadow of better things to come. From the nature of their ritual, and the different prophecies vouchsafed them, which became more and more explicit as the time approached for their accomplishment, they must surely have been led to expect redemption from the curse of the fall by the sufferings of their Messiah; but that any one of them knew precisely the *manner* in which they were to be redeemed, and the nature of that religion which was to supersede their own, is wholly incredible (B). Such knowledge would have

(B) This doctrine is stated in so clear a light by bishop Bull, whom, as a divine, we think the glory of the church of England, and who has had few superiors in any church, that the learned reader will be pleased to have his opinions in his own words. "An igitur, inquires, fuerunt sub lege, qui vitam æternam sperarent? Resp. Qui meliores erant et perspicaciores in populo Judaico, verosimile est eos seu generalium promissionum vi, seu temporalium bonorum levi æstimatione, seu divinæ bonitatis intuitu, seu animæ suæ, melioris quam caduci boni appetentis, consideratione, seu Enochii exemplo (cui sequiori ævo accessit Eliæ raptus) seu Patriarcharum traditione, (quibus Deus multis indiciis spem futurorum bonorum fecerat, in quorum indiciorum genere non minimum erat et illud, quod multi eximie boni terrestres felicitatis expertes vixerint, quod argumentum late exequitur Scriptor ad Hebræos cap. 11.) seu aliis rationibus adductos credidisse, Deum, præter specialia ista bona ad hanc vitam pertinentia, et legibus Mosaicis comprehensa, etiam alia post mortem cultoribus suis fidei largiri velle. Imo statuendum illud omnino est, ne viros sanctos eximiosque in populo Dei suum instar tum vixisse, tum devixisse credatur. Nec refert, quod hujus fidei vix ac ne vix quidem ulla in Canonicis V. T. Scripturis mentio fiat. Nam certum est, Abrahamum filium promissionis, mactare jussu non recusasse, hac ratiocinatione sustentatum, Deum potentia tanta præditum esse, ut filium jam mortuum in vitam revocare, eumque ei redivivum restituere posset. Certum, inquam, illud est, quia divinus Autor Epistolæ ad Hebræos id diserte testatur, cap.

Theology have made them impatient under the yoke of ordinances to which they were subjected; for after the Christian faith came into full splendour, mankind could be no longer under the tuition of such a schoolmaster as the law, which "had only a shadow of good things; and so far from their reality, not even the very image of them†." Through these shadows, however, the Jews, aided by the clearer light of prophecy, though it too shone in a dark place, might have seen enough of God's plan of redemption to make them acknowledge Jesus of Nazareth, when he came among them working miracles of mercy, for the Messiah so long promised to their forefathers, and in whom it was repeatedly said, that all the nations of the earth should be blessed.

† Heb.
x. i.

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Means used
to prepare
the world
for the com-
ing of
Christ.

While such care was taken to prepare the descendants of Abraham for the coming of the Prince of Peace, we must not suppose that God was a respecter of persons, and that the rest of the world was totally neglected. The dispersion of the ten tribes certainly contributed to spread the knowledge of the true God among the eastern nations. The subsequent captivity of the tribes of Judah and Benjamin must have confirmed that knowledge in the great empires of Babylon and Persia; and that particular providence of God which afterwards led Ptolemy Philadelphus to have the Jewish scriptures translated into the Greek language, laid the divine oracles open to the study of every accomplished scholar. At last, when the arms of Rome had conquered the civilized world, and rendered Judea a province of the empire; when Augustus had given peace to that empire, and men were at leisure to cultivate the arts and sciences; when the different sects of philosophers had by their disputations whetted each others understandings so that none of them was disposed to submit to an imposture; and when the police of the Roman government was such that intelligence of every thing important was quickly transmitted from the most distant provinces to the capital of the empire; "when that fulness of time was come, God sent forth his Son made of a woman, made under the law, to redeem them that were under the law, that we might receive the adoption of sons," and be restored to that inheritance of which the forfeiture introduced the several dispensations of revealed religion into the world.

SECT. V. *View of Theology, more peculiarly Christian.*

MANKIND being trained by various dispensations of providence for the reception of that seed of Abraham, in whom all the nations of the earth were to be blessed, and the time fixed by the Jewish prophets for his coming being arrived, "a messenger was sent before his face to prepare his way before him by preaching the baptism of repentance for the remission

of sins." This messenger was John the Baptist, a very extraordinary man, and the greatest of all the prophets. His birth was miraculous, the scene of his ministry the wilderness, his manners austere, and his preaching upright, without respect of persons. He frankly told his audience that he was not the Messiah, that the Messiah would soon appear among them, that "he was mightier than himself, and that he would baptise them with the Holy Ghost and with fire."

Mightier indeed he was; for though born of a woman the Messiah was not the son of a human father; and though living for the first thirty years of his life in obscurity and poverty, he was the lineal descendant of David, and heir to the throne of Israel. But the dignity of his human descent, great as it was, vanishes from consideration when compared with the glory which he had with his Father before the world was. The Jewish dispensation was given by the ministry of Moses, and illustrated by subsequent revelations vouchsafed to the prophets; the immediate author of the Christian religion is the *λογος* or second person of the blessed Trinity, of whom St John declares, that "he was in the beginning with God, and was God; that all things were made by him; and that without him was not any thing made that was made." We have already proved that in the one Godhead there is a Trinity of persons; and that the *λογος* is one of the three, is apparent from these words of the apostle, and from many other passages of sacred scripture. Thus he is called *the Lord of hosts himself; the first and the last, besides whom there is no God; the most high God; God blessed for ever; the mighty God, the everlasting Father, Jehovah our righteousness; and the only wise God our Saviour* (c). This great Being, as the same apostle assures us, was made flesh, and dwelt among men; not that the divine nature was or could be changed into humanity, for God is immutable, the same Almighty and incomprehensible Spirit yesterday, to-day, and forever; but the word or second person in the godhead, assuming a human soul and body into a personal union with himself, dwelt upon earth as a man, veiling his divinity under mortal flesh. Hence he is said elsewhere to have been "manifested in the flesh," and "to have taken upon him the nature of man;" phrases of the same import with that which asserts "the Word to have been made flesh."

This incarnation of the Son of God is perhaps the greatest mystery of the Christian faith, and that to which ancient and modern heretics have urged the most plausible objections. The doctrine of the Trinity is indeed equally incomprehensible; but the nature of God and the mode of his subsistence, as revealed in scripture, no man, who thinks, can be surprised that he does not comprehend; for a revelation which should teach nothing mysterious on such a subject would be as incredible and as useless as another which

3 N 2

contained

cap. 11. 19. Hujus tamen vere admirandæ fidei, atque Evangelicæ supparis, in historia Abrahami nec volam, nec vestigium reperias. Præterea floruerunt singulis sæculis in populo Judaico Viri Dei ac Prophetæ cælitus edocti, quos, inter tot arcana ipsis patefacta, mysticum hunc legis sensum penitus ignorasse, nihilque de futura vita intellexisse, nemo prudens suspicabitur. Cum autem nefas sit vel cogitasse, Viros optimos sapientiam, qua ipsi pollebant, aliis invidisse, credendum omnino est, eos, *sicubi idoneos invenerint Auditores*, evolvisse iis oblecta in lege mysteria, singulisque tantum aperuisse, quantum captus ipsorum et utilitatis ratio ferebat. In publicis autem concionibus Prophetæ ac Sapientes ita loquebantur, ut nec in contemptum adducerent arcana sanctioris disciplinæ, et tamen Auditorem attentum ad investigandi sollicitudinem excitarent. Atque hinc natum arbitratur maximus Grotius discrimen antiquitus inter Judæos celebratum, scriptæ legis, et legis oralis, quam et קבלה i. e. παράδοσις seu Traditionem vocant; utramque dicentes a Mose profectam: non quod res aliæ fuerint in traditione quam in lege scripta; sed quod ea quæ in lege scripta occultius continebantur, studiosis indagatoribus enodaret accuratior interpretatio. *Harmonia Apostolica*, Dissert. post. cap. 10.

(c) Isaiah viii. 13, 14. compared with 1 Peter ii. 7, 8; Isaiah vi. 5. compared with John xii. 41; Isaiah xlv. 6. compared with Revelation xxii. 13; Psalm lxxviii. 56. compared with 1 Corinthians x. 9. Romans ix. 5. Isaiah ix. 6. Jeremiah xxiii. 6. Jude.

Theology, more peculiarly Christian.

contained nothing but *mystery*. The difficulty respecting the incarnation, which forces itself upon the mind, is not how two natures so different as the divine and human can be so intimately united as to become one person; for this union in itself is not more inconceivable than that of the soul and body in one man: but that which at first is apt to stagger the faith of the reflecting Christian is the infinite distance between the two natures in Christ, and the comparatively small importance of the object, for the attainment of which the eternal Son of God is said to have taken upon him our nature.

164 Obviated.

Upon mature reflection, however, much of this difficulty will vanish to him who considers the ways of Providence, and attends to the meaning of the words in which this mystery is taught. The importance of the object for which the WORD condescended to be made flesh, we cannot adequately know. The oracles of truth indeed inform us, that Christ Jesus came into the world to save sinners; but there are passages scattered through the New Testament * which indicate, not obscurely, that the influence of his sufferings extends to other worlds besides this; and if so, who can take upon him to say, that the quantity of good which they may have produced was not of sufficient importance to move even to this condescension a Being who is emphatically styled LOVE?

* Eph. i. 10. Col. i. 19, 20.

But let us suppose that every thing which he did and taught and suffered was intended only for the benefit of man, we shall, in the daily administration of providence, find other instances of the divine condescension; which, though they cannot be compared with the incarnation of the second person in the blessed Trinity, are yet sufficient to reconcile our understandings to that mystery when revealed to us by the Spirit of God. That in Christ there should have dwelt on earth "all the fulness of the Godhead bodily," is indeed a truth by which the devout mind is overwhelmed with astonishment; but it is little less astonishing that the omnipotent Creator should be intimately present at every instant of time to the meanest of his creatures, "upholding all things, the vilest reptile as well as the most glorious angel, by the word of his power." Yet it is a truth self-evident, that without this constant presence of the Creator, nothing which had a beginning could continue one moment in being; that the visible universe would not only crumble into chaos, but vanish into nothing; and that the souls of men, and even the most exalted spirits of creation, would instantly lose that existence, which, as it was not of itself, and is not necessary, must depend wholly on the will of him from whom it was originally derived. See METAPHYSICS, n° 272—276, and PROVIDENCE, n° 3.

Col. ii.

† Heb. i. 3.

In what particular way God is present to his works, we cannot know. He is not diffused through the universe like the *anima mundi* of the ancient Platonists, or that modern idol termed the *substratum of space* (METAPHYSICS, n° 309, 310.); but that he is in power as intimately present now to every atom of matter as when he first brought it into existence, is equally the dictate of sound philosophy and of divine revelation; for "in him we live and move and have our being;" and power without substance is inconceivable. If then the divine nature be not debased, if it cannot be debased by being constantly present with the vilest reptile on which we tread, why should our minds recoil from the idea of a still closer union between the second person of the ever blessed Trinity and the body and soul of Jesus Christ? The one union is indeed different from the other, but we are in truth equally ignorant of the nature of both. Reason and revelation assure us that God must be present to his works to preserve them in existence; and revelation informs us farther, that one of the persons in the Godhead

assumed human nature into a personal union with himself, to redeem myriads of rational creatures from the miserable consequences of their own folly and wickedness. The importance of this object is such, that, for the attainment of it, we may easily conceive that he who condescends to be potentially present with the worms of the earth and the grass of the field, would condescend still farther to be personally present with the spotless soul and body of a man. Jesus Christ lived indeed a life of poverty and suffering upon earth, but his divine nature was not affected by his sufferings. At the very time when, as a man, he had not a place where to lay his head; as God, he was in heaven as well as upon earth*, dwelling in light inaccessible; and while, as a man, he was increasing in wisdom and stature, his divinity was the fulness of him who filleth all in all, and from whom nothing can be hid.

Perhaps the very improper appellation of *mother of God*, which at an early period of the church was given to the Virgin Mary, may have been one cause of the reluctance with which the incarnation has been admitted; for as we have elsewhere observed (see NESTORIUS), such language, in the proper sense of the words, implies what those, by whom it is used, cannot possibly believe to be true; but it is not the language of scripture. We are there taught, that "Christ being in the form of God, thought it no robbery to be equal with God; but made himself of no reputation, and took upon him the form of a servant, and was made in the likeness of man;†" that "God sent forth his Son made of a woman, made under the law, to redeem them that were under the law, that we might receive the adoption of sons;" and that "the WORD who was in the beginning with God, and was God, by whom all things were made, was made flesh, and dwelt among men (who beheld his glory, the glory as of the only begotten of the Father), full of grace and truth;‡" but we are nowhere taught that, as God, he had a mother! It was indeed the doctrine of the primitive church, that the very principle of personality and individual existence in Mary's son, was union with the uncreated word; and this doctrine is thought to imply the miraculous conception, which is recorded in the plainest terms by two of the evangelists; for he was conceived by the Holy Ghost and born of a virgin§; but, as God, he had been begotten from all eternity of the Father, and in order of nature was prior to the Holy Ghost. This is evident from the appellation of *λογος* given to him by St John; for the term being used in that age, both by the Jewish Rabbies and the heathen philosophers, to denote the second divine subsistence, which they considered as an eternal and necessary emanation from the first, sometimes called *τ'αυατον* and sometimes *το εν*; and the apostle giving no intimation of his using the word in any uncommon sense, we must necessarily conclude, that he meant to inform us that the divinity of Christ is of eternal generation. That the term *λογος* was used in this sense by the later Platonists, and in all probability by Plato himself, we have sufficiently shewn in another place (see PLATONISM); and that a similar mode of expression prevailed among the Jews in the time of St John, is apparent from the Chaldee paraphrase; which, in the 110th psalm, instead of the words "the Lord said unto my Lord," has, "the Lord said unto his WORD." Again, where we are told in the Hebrew that Jehovah said to Abraham, "I am thy shield and thy exceeding great reward," we read in the Chaldee, "my WORD is thy shield, and thy exceeding great reward." Where it is said, "your new moons and your appointed feasts my soul hateth," the paraphrast hath it, "my WORD hateth;" and where it is said, that "Israel shall be saved in the Lord with an everlasting salvation," in the same paraphrase it is, "Israel

Theology, more peculiarly Christian.

* John iii. 13.

† Philip. ii. 6, 7.

Gal. iv. 4, 5.

‡ John i. 1.

Horley's Sermon on the Incarnation.

165 His divine nature begotten of the Father.

St Matth. i. 18, &c.

Luke i. 27, &c.

Gen. xv.

* Isaiah i.

† Isaiah xl. 17.

Theology,
more pecu-
liarly Chri-
stian.

168
Corruption
of the Jews
at the time
of his co-
ming.

¶ St John
v. 26 19.
† John vii.
29.

do ||;" and that "he knew the Father, because he was from him and sent by him †." We must therefore agree with bishop Pearson (D), that "though the Father and Son are both truly God, and therefore equal in respect of nature, yet the one is greater than the other, as being the fountain of the Godhead. The Father is God, but *not of God*; Light, but *not of Light*. Christ is God, but *of God*; Light, but *of Light*. There is no difference or inequality in the nature or essence, because the same in both; but the Father of our Lord Jesus Christ hath that essence of himself, from none; Christ hath the same essence, not of himself, but from him."

167

167
Purpose
for which
Christ was
sent into
the world.

(n) We beg leave to recommend to our readers this author's excellent exposition of the apostle's creed, as a work which will render them great assistance in acquiring just notions of the fundamental articles of the Christian faith. They will find it, we think, a complete antidote against the poison of modern Unitarians and modern Tritheists; of whom the former teach that Jesus Christ was a mere man, the son of Joseph as well as of Mary; while the latter, running to the other extreme, maintain, that, with respect to his divinity, he is in no sense subordinate to the Father, but might have been the Father, the Son, or the Holy Ghost, according to the good pleasure of the eternal three. We have been at some pains to prove his divinity, and likewise his eternal generation; but in such a short compend as we must give, it seems not to be worth while to prove his miraculous conception. That miracle is plainly asserted in the New Testament in words void of all ambiguity; and as it is surely as easy for God to make a man of the substance of a woman as of the dust of the earth, we cannot conceive what should have induced any person professing Christianity to call it in question. The natural generation of Christ is a groundless fancy, which can serve no purpose whatever, even to the Unitarians.

Theology, believe. more peculiarly Christian.

Hence that people, losing sight of the yoke under which they and the whole human race were brought by the fall of Adam, mistaking the sense of the blessing promised to all nations through the seed of Abraham, and devoting their whole attention to the most magnificent descriptions of the Messiah's kingdom, expected in him a prince who should conquer the Romans, and establish on earth a universal monarchy, of which Jerusalem was to be the metropolis.

169
The objects of his preaching.

As our Saviour came for a very different purpose, the first object of his mission was to rectify the notions of his erring countrymen, in order to fit them for the deliverance which they were to obtain through him. Accordingly, when he entered upon his office as a preacher of righteousness, he embraced every opportunity of inveighing with becoming firmness against the false doctrines taught as traditions of the elders; and by his knowledge of the secrets of all hearts, he exposed the vile hypocrisy of those who made a gain of godliness. The Jews had been led, by their separation from the rest of the world, to consider themselves as the peculiar favourites of Jehovah; and the consequence was, that, contrary to the spirit of their own law, and the explicit doctrines of some of their prophets, they looked upon all other nations with abhorrence, as upon people physically impure. These prejudices the blessed Jesus laboured to eradicate. Having desired a lawyer, by whom he was tempted, to read that part of the law of Moses which commanded the Israelites to love their neighbours as themselves, he compelled him, by means of a parabolical account of a compassionate Samaritan, to acknowledge, that under the denomination of neighbour the divine lawgiver had comprehended all mankind as the objects of love. The importance in which Moses held the ritual law, and to which, as the means of preserving its votaries from the contagion of idolatry, it was justly intitled, had led the Jews to consider every ceremony of it as of intrinsic value and perpetual obligation: but Jesus brought to their recollection God's declared preference of mercy to sacrifice; shewed them that the weightier matters of the law, judgment, mercy, and faith, claimed their regard in the first place, and its ceremonial observances only in the second; and taught them, in conformity with the predictions of their own prophets, that the hour was about to come when the worship of God should not be confined to Jerusalem, but that "true worshippers should everywhere worship the Father in spirit and in truth. †"

|| St Luke
x. 25—38.

† Jeremiah
xxxi. 31,
&c.

† John iv.
25—27.

It being the design of Christ's coming into the world to break down the middle wall of partition between the Jews and Gentiles, and to introduce a new dispensation of religion which should unite all mankind as brethren in the worship of the true God, and fit them for the enjoyment of heaven; he did not content himself with merely restoring the moral part of the Mosaic law to its primitive purity, disencumbered of the corrupt glosses of the Scribes and Pharisees, but added to it many refined and spiritual precepts, which, till they were taught by him, had never occurred either to Jew or Gentile. The Hebrew lawgiver had prohibited murder under the penalty of death; but Christ extended the prohibition to causeless anger, and to contemptuous treatment of our brethren, commanding his followers, as they valued their everlasting salvation, to forgive their enemies, and to love all mankind. Adultery was forbidden by the law of Moses as a crime of the deepest dye; but Jesus said to his disciples, "that whosoever looketh on a woman to lust after her, hath committed adultery with her already in his heart," and is of course liable to the Divine vengeance. The *lex talionis* was in force among the Jews, so that the man who had deprived his neighbour of an eye or a tooth, was to suffer the

loss of an eye or a tooth himself; but this mode of punishment, which inflicted *blemish* for *blemish*, though suited to the hardness of Jewish hearts, being inconsistent with the mild spirit of Christianity, was abolished by our blessed Lord, who severely prohibited the indulgence of revenge, and commanded his followers to love even their enemies. Perjury has in every civilized nation been justly considered as a crime of the highest atrocity, and the Mosaic law doomed the false witness to bear the punishment, whatever it might be, which he intended by swearing falsely to bring upon his brother; but the Author of the Christian religion forbade not only false swearing, but swearing at all, except on solemn occasions, and when an oath should be required by legal authority. See OATH.

By thus restoring the law to its original purity, and in many cases extending its sense, the blessed Jesus executed the office of a PROPHET to the lost sheep of the house of Israel; but had he not been more than an ordinary prophet, he could not have abrogated the most trivial ceremony of it, nor even extended the sense of any of its moral precepts; for their great lawgiver had told them, that "the Lord their God would raise up unto them but one Prophet, like unto him, to whom they should hearken †." That Prophet was by themselves understood to be the Messiah, whom they expected to tell them all things. It was necessary therefore that Jesus, as he taught some new doctrines, and plainly indicated that greater changes would soon be introduced, should vindicate his claim to that exalted character which alone could authorize him to propose innovations. This he did in the amplest manner, by fulfilling prophecies and working miracles (see MIRACLE and PROPHECY); so that the unprejudiced part of the people readily acknowledged him to be of a truth "that prophet which should come into the world—the Son of God, and the King of Israel." He did not, however, make any change in the national worship, or assume to himself the smallest civil authority. He had submitted to the rite of circumcision, and strictly performed every duty, ceremonial as well as moral, which that covenant made incumbent upon other Jews; thus fulfilling all righteousness. Though the religion which he came to propagate was in many respects contrary to the ritual law, it could not be established, or that law abrogated, but in consequence of his death, which the system of sacrifices was appointed to prefigure; and as his kingdom, which was not of this world, could not commence till after his resurrection, he yielded during the whole course of his life a cheerful obedience to the civil magistrate, and wrought a miracle to obtain money to pay the tribute that was exacted of him. Being thus circumstanced, he chose from the lowest and least corrupted of the people certain followers, whom he treated with the most endearing familiarity for three years, and commissioned at his departure to promulgate such doctrines as, consistently with the order of the divine dispensations, he could not personally preach himself. With these men, during the course of his ministry on earth, he went about continually doing good, healing the sick, casting out devils, raising the dead, reproofing vice, preaching righteousness, and instructing his countrymen, by the most perfect example which was ever exhibited in the world, of whatsoever things are true, or honest, or just, or pure, or lovely, or of good report. The Scribes and Pharisees, however, finding him not that conqueror whom they vainly expected, becoming envious of his reputation among the people, and being filled with rancour against him for detecting their hypocritical arts, delivered him up to the Roman governor, who, though convinced of his innocence, yielded to the popular clamour, and crucified him between two thieves, as an enemy to Cæsar.

Theology, more peculiarly Christian.

170
In which he executed the office of a prophet.

† Deut.
xviii. 15.

171
His strict obedience to the law.

Theology,
more pecu-
liarly Chri-
stian.

|| St
Matth. xx.
28.

172
He volun-
tarily died
for us.

† Chap.
liii.

† 1 Peter
ii. 21. and
24.

† 1 John i.
7 ii. 2.

§ St John
2. 18.

* Ibid.
ver. 11.

173
Different
opinions
respecting
the nature
and extent
of the be-
nefit reap-
ed from
his death.

Just before he expired, he said, It is finished, intimating that the purpose was now fulfilled for which he had come into the world, and which, as he had formerly told his disciples, "was not to be ministered unto but to minister, and to give his life a ransom for many ||." For his blood, as he assured them at the institution of the Eucharist, "was to be shed for the remission of sins." That Christ died voluntarily for us, the just for the unjust, and that "there is none other name under heaven given among men whereby we must be saved;" is the uniform doctrine of the prophets who foretold his coming, of John the Baptist who was his immediate harbinger, and of the apostles and evangelists who preached the gospel after his ascension into heaven. Thus Isaiah says of the Messiah †, that "he was wounded for our transgressions, and bruised for our iniquities; that the chastisement of our peace was upon him, and that with his stripes we are healed; that we had all like sheep gone astray, turning every one to his own way, and that the Lord laid on him the iniquity of us all; that he was cut off out of the land of the living, and stricken for the transgression of God's people; that his soul or life was made an offering for sin; and that he bore the sin of many, and made intercession for the transgressors." The Baptist, "when he saw Jesus coming unto him, said to the people, Behold the Lamb of God, which taketh away the sin of the world;" plainly intimating that his death was to be a sacrifice, since it was only as a sacrifice that the Jews could form any conception of a lamb taking away sin. The epistles of St Paul are so full of the doctrine of Christ's satisfaction, that it is needless from his writings to quote particular texts in proof of it. He tells the Romans, that Jesus Christ was set forth to be a propitiation through faith in his blood; that he was delivered for our offences, and "raised again for our justification; that he died for the ungodly; and that God commendeth his love towards us, in that while we were yet sinners Christ died for us." He assures the Corinthians that Christ died for all; that they who live should not henceforth live unto themselves, but to him who died for them and rose again; and that God made him to be sin for us who knew no sin, that we might be made the righteousness of God in him." He informs the Galatians, that Christ "gave himself for our sins, that he might deliver us from this present evil world, according to the will of God and our Father; and that he redeemed us from the curse of the law, being made a curse for us." St Peter and St John talk the very same language; the former teaching us, that "Christ suffered for us, and bare our sins in his own body on the tree †; the latter, that the blood of Jesus Christ cleanseth us from all sin, and that he is the propitiation for our sins; and not for our's only, but also for the sins of the whole world ‡." That he came into the world for the purpose of suffering, appears from his own words: for "no man (said he §) taketh my life from me, but I lay it down of myself: I have power to lay it down, and I have power to take it again. This commandment have I received from my Father." And that he voluntarily laid it down for mankind, is evident from his calling himself the Good Shepherd, and adding, that "the Good Shepherd giveth his life for the sheep *."

That Christ died for the benefit of the human race, is a truth so apparent from these texts, and from many others which might be quoted, that no man professing Christianity has hitherto called it in question. Very different opinions have been formed indeed concerning the nature and extent of that benefit, and the means by which it is applied; but that the passion and death of the blessed Jesus were essential parts of his ministry on earth, has never been controverted, unless perhaps by those modern Unitarians who have cor-

rected the errors of the apostles and evangelists, and with whose writings we acknowledge ourselves to be very little acquainted. That on the cross he made satisfaction to his Father for the sins of the world, is the general belief of Christians; but presumptuous men, aiming at being wise beyond what is written, have started a thousand idle questions concerning the necessity of such satisfaction, and the manner in which it was made. Some limiting the power and mercy of the Omnipotent, have dared to affirm that God *could not* have pardoned man without receiving full satisfaction for his offences; that nothing but the shedding of the blood of Christ could make that satisfaction; that his death was indeed sufficient to atone for a thousand worlds; that, however, he did not die for all mankind, but only for a chosen few, ordained to eternal life by a secret decree before the foundation of the world; and that the rest of the race are passed by, and doomed to eternal perdition, for the glory of God's justice. Others, convinced by every thing around them that the Creator and Governor of the universe is a being of infinite benevolence, whose only end in giving life must have been to communicate happiness, have contended, that no atonement whatever could be necessary to obtain from him the forgiveness of sin upon sincere repentance; that it is contrary to all our notions of justice to punish the innocent for the guilty; and that therefore the death of Christ, though an essential part of his ministry, could not be necessary, but at the most expedient.

We enter not into these impious debates. The Scriptures have nowhere said what God could or could not do; and on this subject we can know nothing but what they have taught us. That "we are reconciled to God by the death of his Son," is the principal doctrine of the New Testament; and without presuming to limit the power, the mercy, or the wisdom, of him who created and sustains the universe, we shall endeavour to show that it is a doctrine worthy of all acceptance. In doing this, we shall state impartially the opinions which men really pious have held respecting the form or manner in which Christ by his death made satisfaction to God for the sins of the world; and we hope that our readers, disregarding what may be prejudices in us, will embrace that opinion which shall appear to them most consonant to the general sense of sacred Scripture.

The strictest adherents to the theological system of Calvin, interpreting literally such texts of Scripture as speak of his being *made sin* for us, of his *bearing our sins in his own body on the tree*, and of the Lord's *laying on him the iniquity of us all*, contend, that the sins of the elect were lifted off from them and laid upon Christ by *imputation*, much in the same way as they think the sin of Adam is imputed to his posterity. "By bearing the sins of his people (says Dr Gill *), he took them off from them, and took them upon himself, bearing or carrying them as a man bears or carries a burden on his shoulders. There was no sin in him inherently, for if there had, he would not have been a fit person to make satisfaction for it; but sin was *put* upon him by his Divine Father, as the sins of the Israelites were put upon the scape-goat by Aaron. No creature (continues he) could have done this; but the Lord hath laid on him, or made to meet on him, the iniquity of us all, not a single iniquity, but a whole mass and lump of sins collected together, and laid as a common burden upon him; even the sins of all the elect of God. This phrase of laying sin on Christ is expressive of the *imputation* of it to him; for it was the will of God not to impute the transgressions of his elect to themselves, but to Christ, which was done by an act of his own; for he hath made him to be sin for us; that is, by *imputation*, in which way we are made the righteousness of God in him; that

Theology,
more pecu-
liarly Chri-
stian.

174
Opinions
of the Cal-
vinists

* Body of
Divinity,
vol. ii.
book iii.
chap. v.
§ 4.

Theology, that being imputed to us by him as our sins were to Christ. The sense (says our author) is, a charge of sin was brought against him as the surety of his people. He was numbered with the transgressors; for bearing the sins of many, he was reckoned as if he had been a sinner himself, sin being *imputed* to him; and was dealt with as such. Sin being found upon him by *imputation*, a demand of satisfaction for sin was made, and he answered it to the full. All this was with his own consent. He *agreed* to have sin laid upon him, and *imputed* to him, and a charge of it brought against him, to which he engaged to be responsible; yea, he himself took the sins of his people upon him; so the evangelist Matthew has it, 'Himself took our infirmities, and bore our sicknesses †.' As he took the nature of men, so he took their sins, which made his flesh to have *the likeness of sinful flesh*, though it really was not sinful. What Christ bore being laid upon him, and imputed to him, were *sins* of all sorts, original and actual; sins of every kind, open and secret, of heart, lip, and life; all acts of sin committed by his people, for he has redeemed them from all their iniquities; and God, for Christ's sake, forgives all trespasses, his blood cleanses from all sin, and his righteousness justifies from all; all being imputed to him as that is to them. Bearing sin supposes it to be a burden; and indeed it is a burden too heavy to bear by a sensible sinner (E). When sin is charged home upon the conscience, and a faint groans, being burdened with it, what must that burden be, and how heavy the load which Christ bore, consisting of all the sins of all the elect from the beginning of the world to the end of it? and yet he sunk not, but stood up under it; failed not, nor was he discouraged, being the mighty God, and the Man of God's right-hand, made strong for himself."

† Chap.
viii. 17.

To the Arminians or Remonstrants, this doctrine of the imputation of the sins of men to the Son of God appears as absurd as the similar doctrine of the imputation of the sin of Adam to his unborn posterity; and it is certainly attended with consequences which have alarmed serious Christians of other denominations.

Were it possible in the nature of things, says the Arminian, to transfer the guilt of one person to another, and to lay it upon him as a burden, it could not be done without violating those laws of equity which are established in the scripture and engraven on the human heart. But this is not possible. To talk of lifting lumps of sin or transferring them like burdens from the guilty to the innocent, is to utter jargon, says he, which has no meaning; and we might with as much propriety speak of lifting a scarlet colour from a piece of cloth and laying it on the sound of a trumpet, as of literally lifting the sins of the elect from them and laying them on Christ. Guilt is seated in the mind; and no man can become a sinner but by an act of volition. If Christ therefore *really* took upon him the sins of his people, he must have deliberately formed a wish to have actually *committed* all those sins; but such a wish, though it would have made him inherently guilty, and therefore incapable of satisfying for sin, could not have cancelled deeds that were done before he was born, or have made those innocent who had really been sinners. A deed once done cannot be undone; a volition which has been formed cannot be annihilated. By sincere repentance, the habitual dispositions are indeed changed, and those who have been sinners become objects of mercy; but no power can recal the hours that are past, or make those actions which have been performed to have been not

performed. To remove guilt from the sinner and lay it upon the innocent may therefore be safely pronounced impossible even for Omnipotence itself, for it implies that a thing may be and not be at the same instant of time; and the doctrine which teaches that this removal was made from the elect to Christ, is an imagination of yesterday, which has no countenance from scripture, and is contrary to the established constitution of things. Those who imagine that guilt may be propagated from father to son, have something like an argument to urge for the imputation of Adam's sin to his numberless posterity; for all the men and women who have by ordinary generation been introduced into the world, have undoubtedly derived their nature from the primeval pair. But Christ did not derive his nature from the *elect*, that their sins should be communicated to him; nor, as he was miraculously conceived by the Holy Ghost, can we attribute to him any degree of that *taint* which is supposed to have been conveyed from Adam to all the other generations of men.

Nothing more, therefore, can be meant by "Christ's bearing made sin for us," and "bearing our sins in his own body on the tree," or by God's "laying upon him the iniquity of us all," than that by his sufferings we are freed from the punishment of our sins; it being in scripture a common figure of speech, as even Dr Gill has somewhere acknowledged, to denote by the word *sin* the *consequences* of sin. That this figure is used in those texts from which he infers that Christ took the sins of the elect upon himself, is evident from the verse which he quotes from the gospel of St Matthew; in which it is said, that "himself took our infirmities and bore our sicknesses." The sicknesses and infirmities there alluded to are the leprosy, the palsy, the fever, and demoniacal possessions; but when our blessed Lord cured these diseases, surely he did not by his omnipotent word lift them off from the patients and take them on himself, so as actually to become a leper, a paralytic, and a demoniac, or even to be reckoned as such either by the multitude, or by the priests whose duty it was to take cognizance of every legal uncleanness*. And if his inveterate enemies* did not *impute* to him the leprosy when he removed that plague from others, why should it be supposed that his own Father, to whom he was at all times well-pleasing, *imputed* to him those sins of which, by his sufferings, he removed the punishment from those who were guilty? To impute to a person any action, whether virtuous or vicious, which he did not perform, can proceed only from ignorance, or malice, or partiality; but God is no respecter of persons, and from ignorance and malice he is removed to an infinite distance. It is indeed an undoubted truth, that "the Lord Jesus, by his perfect obedience and sacrifice of himself, which he through the eternal spirit once offered up unto God, hath fully satisfied the justice of his Father; and purchased not only reconciliation, but an everlasting inheritance in the kingdom of heaven for all those whom the Father hath given him †;" but that he actually took upon himself the sins of mankind, or that those sins were imputed to him by God, who punished him as a person whom he considered as guilty, is a doctrine equally injurious to the justice of the Father and to the immaculate purity of the Son.

The earnestness with which this doctrine was inculcated by some of the earliest reformers, and the impossibility of admitting it, which every reflecting and unprejudiced mind must feel, was probably one of the causes which drove So-

(E) By the phrase *a sensible sinner*, the learned author means a sinner who is not past feeling, but has a conscience alive to the sense of remorse.

Theology,
more pecu-
liarily Chri-
stian.

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Texts on
which they
are built
explained.

† Confession
of Faith,
chap. viii.
§ 5.

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They have
probably
contributed
to make
So-
cinius
deny the
doctrine of
redemp-
tion.

Theology. cinus and his followers to the other extreme of denying Christ's more pecu- satisfaction altogether, and considering his death as nothing liarily Chri- more than that of an ordinary martyr, permitted for the stian. purpose of attesting the truth of his doctrine, and paving the way for his resurrection, to confirm the great promise of immortality. According to these men, forgiveness is freely dispensed to those who repent, by the essential goodness of God, without regard to the merit or sufferings of any other being; and the gospel is said to save from sin, because it is the most perfect lesson of righteousness. The great objection of *Orrellius* to the doctrine of the satisfaction is, that it is a hinderance to piety; for if Christ has paid the whole debt, he thinks that we must have nothing to do, as nothing more can be required of us. And if it were indeed true that our sins are imputed to Christ, and his righteousness imputed to us, this objection would be insurmountable; for God could not justly exact a double punishment for the same sin, or inflict misery upon those to whom he imputes perfect righteousness. But as to this imaginary transferring of virtues and vices from one person to another, the Christian scriptures give no countenance; so they nowhere call the death of Christ a *satisfaction* for the sins of men. The term has indeed been long in use among divines, and when properly explained it may be retained without any danger; but in treating of this subject, it would perhaps be more prudent to restrict ourselves to the use of scripture language, as the word *satisfaction* carries in it the ideas of a debt paid and accepted; whereas it is said by St Paul, that "eternal life is the gift of God through Jesus Christ our Lord; and that we are justified freely by his grace through the redemption that is in Jesus Christ, whom God hath set forth to be a propitiation through faith in his blood."

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The death
of Christ
restored to
mankind
what they
had lost in
Adam.

Ch. i. ver.
23.

To clear up this matter, and attain adequate notions of redemption and justification, it will be necessary to look back to the fall of our first parents; for the great purpose for which Christ was promised, and for which he came into the world, was, by bruising the head of the serpent, to restore mankind to the inheritance which they had lost through the transgression of Adam. This is apparent not only from the original promise made to the woman, but also from different passages in the epistles of St Paul, who expressly calls Christ the second Adam, and says, that, "as by the offence of one, judgment came upon all men to condemnation; even so by the righteousness of one, the free-gift came upon all men unto justification of life;" that "as by one man's disobedience many were made sinners, so by the obedience of one shall many be made righteous;" and that, "as in Adam all die, even so in Christ shall all be made alive." Hence it was that John the Baptist, when he saw Jesus coming to him, said to his disciples †, "Behold the Lamb of God which taketh away, not the *sins*, but the *sin* of the world," evidently alluding to Adam's sin and its consequences, since no other sin was ever committed of which the consequences extend to the whole world.

† Heb. ix.
26. 1 Thess.
v. 10.

This being the case, it is undeniable, that whatever we lost in the first Adam is restored to us by the second; and therefore they who believe that the punishment denounced against eating the forbidden fruit was death *corporal*, *spiritual*, and *eternal*, must believe that we are redeemed from all these by Christ; who having "appeared once in the end of the world to put away sin by the sacrifice of himself, died for us, that whether we wake or sleep we should live together with him *." If the image of God in which man was created was lost by the breach of the first covenant, it is more than restored to us "by the Mediator of a better covenant, which is established upon better promises;" if by the sin of Adam we were utterly indisposed, disabled,

and made opposite to all that is spiritually good, and wholly inclined to all evil, and that continually, we are freed from that dreadful curse by "our Saviour Jesus Christ, who gave himself for us, that he might redeem us from all iniquity, and purify to himself a peculiar people zealous of good works †;" † Titus ii. 14. and if for our share in the first transgression we be justly liable to all punishments in this world and in that which is to come, the apostle assures us, that "when we were enemies we were reconciled to God by the death of his Son, because that God was in Christ reconciling the world to himself, not imputing their trespasses unto them ‡." As Jesus is † Rom. v. 10. 2 Cor. v. 19. "the Lamb slain in the divine decree from the foundation of the world," these beneficial consequences of his death have been extended by a retrospective view to all in every age whose names are written in the book of life, though it is absurd to suppose that he literally took their sins upon him, and impious to imagine that he suffered under the imputation of sin.

Such is the general doctrine of redemption, as it is taught by the more moderate Calvinists and more moderate Remonstrants; for moderate Christians of all denominations, though they express themselves differently, have nearly the same views of the fundamental articles of their common faith. It must not, however, be concealed, that many divines of great learning and piety, though removed to an infinite distance from the school of Socinus, contend strenuously against the doctrine of vicarious atonement for actual transgressions of the moral law. These are the more zealous Arminians, who deny that we inherit any moral taint or intellectual weakness from our first parents, whom they believe never to have been in a state of greater perfection than many of their posterity who are called *degenerate*. According to them, we lost nothing by the fall of Adam but our title to eternal life or perpetual existence, together with those graces of the Holy Spirit which were bestowed under the first covenant to train mankind for the society of heaven; and as eternal life and supernatural grace constituted one free-gift, not due to the nature of man, or indeed of any created being, they might, when forfeited, be restored by any means or upon any condition which should seem expedient to the all-wise Donor. These means, and that condition, human reason cannot indeed discover; but it seems very fit that they should be different from the means by which moral agents under the law of nature can secure to themselves the favour of their Creator, or recover it when occasionally lost. The former depends on arbitrary will and pleasure, or at least upon no other principles discoverable by us; while the latter ariseth out of the established and well-known constitution of things. Thus moral virtue, comprehending piety, was the condition of that favour and protection which the creature man, in his original state, could claim from his Maker; but obedience to a positive command was the condition of the free gift of immortality conferred upon Adam on his introduction into paradise. The claim arising from the relation between the creature and the Creator is indissoluble, because that relation cannot be dissolved: so that the man who, by a transgression of the moral law, or of any part of that system which is called the *religion of nature*, has forfeited the favour of God, may reasonably hope to recover it by sincere repentance and a return to his duty: and nothing but such repentance and reformation can recover it; because, in a moral agent, nothing can be agreeable to God but moral dispositions, which cannot be transferred from one person to another, and for the want of which nothing can atone. Our virtues are not required nor our vices prohibited, as if the one could profit and the other injure him who created us; for "is it any pleasure to the Almighty that we are righteous? or is it

Theology.
more pecu-
liarily Chri-
stian.

Rom. v.
10. 2 Cor.
v. 19.

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Moderate
Calvinists
and Re-
monstrants
of the same
opinion.

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Doctrine of
the more
zealous Ar-
minians.

Theology, more peculiarly Christian.

gain to him that we make our ways perfect? Will he reprove us for *fear of us*?" No! He commands us to be virtuous, and forbids us to be vicious, only because virtue is necessary to our own happiness, and vice productive of everlasting misery.

Were an immoral man to be introduced into the society of angels and just men made perfect, he would not experience in that society what we are taught to expect from the joys of heaven; because to such joys his acquired dispositions would be wholly repugnant. Nor could the sufferings of any person whatever, or the *imputation* of any extrinsic righteousness, make that mind which had long been immersed in the grossest sensuality relish the intellectual and refined enjoyments of heaven; or the man who had been the habitual slave of envy, malice, and duplicity, a fit inhabitant of that place where all are actuated by mutual love. On the other hand, say the divines whose doctrine we are now detailing, it is impossible to suppose that the Father of mercies, who knows whereof we are made, should have doomed to eternal misery any moral agent who had laboured through life to serve him in sincerity and in truth; or that any atonement could be necessary to redeem from the pains of hell the man whose pious and virtuous dispositions have through penitence and prayer become suited to the society of heaven. Unsinning perfection never was nor ever could be expected in man. He is brought into the world free indeed from vice, but equally destitute of virtue; and the great business of his life is to guard his mind from being polluted by the former, and to acquire dispositions habitually leading to the practice of the latter. Till these habits be fairly formed, it seems impossible that he should not sometimes deviate from the paths of rectitude, and thereby incur a temporary forfeiture of the divine favour; but the very constitution of his mind, and the purpose for which he is placed in a state of probation, show that the divine favour thus forfeited can be recovered only by repentance and reformation.

Widely different, however, is the case with respect to the forfeiture and recovery of a free gift, to which man has no natural claim. When the condition is broken on which such a gift was bestowed, repentance can be of no avail; it must be either irrecoverably lost, or restored by the mere good pleasure of the giver. Immortality or perpetual existence is a gift which upon certain terms was freely bestowed upon the human race, and forfeited by the transgression of their first parent violating those terms. It was restored by the free grace of God, who was pleased to ordain, that "since by man came death, by man should also come the resurrection of the dead; for as in Adam all die, even so in Christ shall all be made alive." Hence the apostle, writing to the Romans of the benefits of being the children of God, and joint-heirs with Christ, summeth up those benefits with the resurrection from the dead.* For the creature, *i. e.* mankind, was made subject (says he *) to vanity or death, not willingly, but by reason of him who hath subjected the same in hope: because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the whole creation groaneth, and travaileth in pain together until now: and not only *they*, but *ourselves* also, who have

the first fruits of the spirit, even we ourselves, groan within ourselves, waiting for the adoption, viz. the redemption of our body (F). That this redemption of our body is the consequence of the sacrifice of Christ, is taught in the most explicit terms in the epistle to the Hebrews; of which the inspired author informs us, that "forasmuch as the children are partakers of flesh and blood, he also himself likewise took part of the same; that through death he might destroy him that had the power of death, that is the devil; and deliver them, who through fear of death were all their life-time subject to bondage †." A vicarious atonement made with this view, the divines, whose theory we are now considering, acknowledge to be perfectly rational and consistent with the strictest justice. "The law of nature (say they §) allows not of vicarious atonements; but ordains that the man who transgresseth shall himself bear the punishment of his iniquity; a punishment which no man deserves for the faults of another, unless he be partaker of the guilt by joining in the transgression." And in proof of this their opinion, they appeal to the words of God himself, declaring to Moses, — "Whoever hath sinned against me, him will I blot out of my book *." But when the free gift of immortality was lost, it was with great wisdom, say they, that God restored it through a Mediator who should make atonement by his blood for the breach of the first covenant; since such a mediation implies that the gift restored is merely of grace, to the attainment of which man could no further co-operate than by his hopes and wishes.

To this view of redemption, and indeed to every view of it which we have yet taken, an objection forces itself upon the mind. Throughout the New Testament LIFE AND IMMORTALITY are considered as a *FREE gift*, and called so in express words by St Paul *. To the scheme under consideration it is essential to consider them as such; and yet we know that a large price was paid for them, as St Paul likewise acknowledges, when he twice tells the Corinthians that they were bought with a price §.

"To clear up this matter (says bishop Warburton), and to reconcile the apostle to himself, who certainly was not defective either in natural sense or artificial logic, let us once again remind the reader, that life and immortality bestowed on Adam in paradise was a *FREE gift*, as appears from the history of his creation. As a *free gift*, it was taken back by the Donor when Adam fell; to which resumption our original natural rights are not subject, since natural religion teacheth, that sincere repentance alone will reinstate us in the possession of those rights which our crimes had suspended. So that when this free gift, forfeited by the *first* Adam, was recovered by the *second*, its nature continuing the same, it must still remain a *free gift*—a gift to which man, by and at his creation, had no claim; a gift which natural religion did not bestow. But if misled by measuring this *revealed mystery* of human redemption by the scant idea of human transactions, where a *free gift* and *purchased benefit* are commonly opposed to one another, yet even here we may be able to set ourselves right, since, with regard to man, the character of a *free gift* remains to *immortality restored*. For the price paid by forfeited man was not paid by him, but by a Redeemer of divine extraction, who was pleased, by participating

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That Christ died to redeem us from the power of the grave.

* Rom. viii. 20—24.

(F) That by the words *creature* and *creation* the apostle here means all mankind, and by *vanity* and *corruption*, death, the reader will find proved by Dr Whitby, in his note on the place, with a strength of argument which cannot be shaken; and that the whole creation, the Gentiles as well as the Jews, groaned and travailed in pain together under the apprehension of death, is apparent from the writings of Cicero, who always seems doubtful whether death be a good or an evil; and from the lamentation of Hezekiah, when desired by the prophet to set his house in order because he should die and not live.

Theology, participating of man's nature, to stand in his stead. Hence the more peculiarly Christian. sacred writers seeing, in this case, the perfect agreement between a *FREE GIFT* and a *PURCHASED POSSESSION*, call it sometimes by the one and sometimes by the other name *."

* Div. Leg. A restoration to life and immortality from that state of book 9. ch. unconscionableness or extinction as living agents, to which all mankind were doomed in consequence of the fall of Adam, is that great salvation which we have obtained through the blood of our Redeemer; and according to the theologians whose theory we are now considering, it was the only thing in the divine intention when the promise was given to the first mother that the seed of the woman should bruise the head of the serpent. But though they contend thus earnestly that the death of Christ does not operate *directly* as an atonement for the *actual* sins of men, they admit that it does so *indirectly* and by necessary consequence, since it gives opportunities for repentance and newness of life, which under the first covenant they did not enjoy. Had a man under that covenant transgressed any moral precept, he would of course have forfeited the favour of his God, and either been subjected to punishment or to a long course of repentance; but supposing the efficacy of repentance under the law of nature to be what they suppose it to be, he might before it was perfected have lost his existence by the eating of the forbidden fruit; and thus his penitence or punishment have ended in everlasting death. This can never be the issue of things under the new covenant, which, by the death of Christ, secures immortality to man, and gives to him opportunities, as long as he shall be in a state of probation, of recovering the divine favour when forfeited, whether by a moral transgression or a temporary violation of the peculiar condition of the covenant. Hence they admit the truth of the apostle's doctrine, that we are gainers by the fall of Adam and the redemption wrought by Christ; which will appear when we come to consider their notions of Christian justification. In the mean time it may be proper to observe, that they consider it as no small confirmation of their opinion, that it tends to put an end to the long agitated disputes concerning the *extent* of redemption, and to reconcile passages of scripture which, on the commonly received theories both of Calvinists and Arminians, seem to be at variance with each other.

185 According to the Calvinists, Christ died only for the elect. † Confession of Faith of the Church of Scotland, ch. iii. § 6. ‡ Gill's Body of Divinity, vol. ii. book 3, ch. 3. It is well known to be one of the fundamental doctrines of the Calvinistic school, that "none are redeemed by Christ, effectually called, justified, adopted, sanctified, and saved, but the elect only †;" and if the notions of redemption, which, in the end of the last century, were very generally embraced, be admitted as just, it will not be easy to overturn the arguments by which that doctrine is supported. Such of them as are connected with the great question of election and reprobation, and enter into the decision of it, we have stated in another place (see *PREDESTINATION*, n^o 14); but it is farther argued ‡, that the doctrine of *universal* redemption reflects on the wisdom, the justice, and the power of God, and robs him of his glory.

The scriptures assure us that all men shall not be saved; but how can this be, if Christ died for all, and the scheme of salvation by his death was formed by infinite wisdom? The Arminians indeed say, that those who fail of salvation, fail through their own fault in not performing the conditions required of them; but God either *knew* or *knew not* that such men would not perform those conditions. If he knew it not, his knowledge is limited; if he did know it, where was his wisdom in providing a scheme of redemption for men to whom he was aware that it would be of no benefit? "God, we are told, is righteous in all his ways and holy in all his works;" but there is no righteousness in making Christ bear the sins of *all* men, and suffer the punish-

men due to them, if any one of those men shall be afterwards punished everlastingly. If Christ has already paid the debts of the whole world, it cannot be just to cast a single inhabitant of the world into the prison of hell, there to be detained till he shall again have paid the uttermost farthing. "The Lord's hand is not shortened that it cannot save;" for he is and always will be the same Almighty power that he was from eternity; but if by the divine decree Christ died for all men, and yet all men shall not be saved, it would appear that man is mightier than his Maker! The ultimate end of God in the redemption of man is admitted to have been his own glory; but if any individual of the human race, who was redeemed by Christ, shall not be saved, God will so far lose his end, and be deprived of his glory. For, if this were the case, where would be the glory of God the Father in forming a scheme which, with respect to multitudes, does not succeed? and where would be the glory of the Son of God, the Redeemer, in working out the redemption of men who are yet not to be saved by him? and where would be the glory of the spirit of God, if redemption were not by him effectually applied to every individual for whom it was wrought? By such arguments as these do the Calvinists oppose the scheme of universal redemption, and contend that Christ died only for the *elect*, or such as shall be placed on his right hand at the day of judgment. This notion of a limited redemption, as they think it more worthy of the sovereignty of God, they believe to be taught by our Saviour himself, when he saith *, "All that the Father giveth me shall come to me; and him that cometh to me, I will in nowise cast out. For I came down from heaven, not to do mine own will, but the will of him that sent me. And this is the Father's will who hath sent me, that of all which he hath given me I should lose nothing, but should raise it up again at the last day."

186 The Arminians, on the other hand, contend, that it is impious to limit the effects of Christ's death to a chosen few, since it appears from scripture, that by the decree and intention of his Father he tasted death for every man, that all, without exception, might through him obtain remission of their sins. Thus our Lord himself told Nicodemus †, that "as Moses lifted up the serpent in the wilderness, even so must the Son of Man be lifted up; that whosoever believeth in him, should not perish, but have everlasting life. For God so loved the world, that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life. For God sent not his Son into the world to condemn the world, but that the world through him might be saved." In perfect conformity with the doctrine of his divine Master, St Paul teaches ‡, that "Christ died for all; that God was in Christ reconciling the world to himself, not imputing their trespasses unto them;" that "he will have all men to be saved, and to come unto the knowledge of the truth;" that "Christ gave himself a ransom for all;" and that "Jesus was made a little lower than the angels, that by the grace of God he should taste death for every man." The very same thing is taught by St Peter and St John, when the former says §, that "the Lord is not willing that any should perish, but that all should come to repentance;" and the latter ||, that "Jesus Christ the righteous is the propitiation for our sins; and not for our's only, but for the whole world."

Upon these texts, without any commentary, the Arminians are willing to rest their doctrine of universal redemption; though they think that a very strong additional argument for its truth arises from the numberless absurdities which flow from the contrary opinion. Thus, say they *, the apostles were commanded by our Saviour † to "go in to all the world and preach the gospel to every creature,"

Theology, and all who hear it preached are required to believe it: but more peculiarly Christian.

no man, as the Calvinists themselves confess, can believe the gospel as a Christian, without believing that Christ *died for him*; and therefore, if it be true that Christ died only for the *elect*, a great part of mankind are required to believe a lie, and a falsity is made the object of divine faith! Again, if Christ did not die for *all*, then no man can be sure that he is bound to believe in Christ when preached to him; nor can any man be justly condemned for infidelity: which is not only absurd in itself, but directly contrary to what we are taught by our blessed Lord, who assures us *, that unbelief is the cause of condemnation. Lastly, if Christ died not for *all*, then is it certain that he cannot claim dominion *over all* in consequence of his *death and resurrection*; but St Paul says expressly †, that “to *this end* Christ both *died*, and *rose*, and *revived*, that he might be the Lord both of the *dead* and *living*.” The Arminians acknowledge, that though Christ died for *all*, there are many who will not be saved; for, say they ‡, the death of Christ did not literally pay the debts incurred by sinners, but only obtained for them the gracious covenant of the gospel, by which all who believe in him, and sincerely endeavour to work out their own salvation with fear and trembling, are entitled to forgiveness of sins and eternal life.

* St John iii. 18, 19, and 36.

† Rom. xiv. 9.

‡ Wells's Div. Laws and Covenants, part 2. ch. 3.

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Difficulties removed by the modern Arminians.

Such is the state of this controversy as it was agitated between the Calvinists and Arminians of the last century; but the present leaders of this latter school are of opinion, that it never could have been started, had not both parties mistaken the purpose for which Christ died. It is not conceivable, say they, that any thing for which the eternal Son of God took upon him human nature, and in that nature suffered a cruel and ignominious death, shall not be fully accomplished; and therefore, if in the divine intention he died to make atonement for the sins of man actual as well as original, we must of necessity conclude that those for whom he died shall certainly be saved. Yet we learn from scripture that many shall go away into everlasting punishment, though the same scripture repeatedly assures us that Christ gave his life a ransom for *all*, and that he is the propitiation for *the whole world*. To reconcile these different passages of scripture is impossible, if we suppose that he laid down his life to atone for the *actual* transgressions of men; but if the direct purpose of the Godhead in forming this stupendous plan of redemption was, that the death of Christ should be the ransom of all from the grave or utter extinction, every difficulty is removed; for we know that all, the wicked as well as the righteous, shall through him be raised to life at the last day. That this was the purpose for which he died, they think apparent from the very words quoted by the Calvinists to prove that redemption was not universal; for he declares that it was his Father's will, “that of all which had been given him he should lose nothing,” not that he should save it all from *future punishment*, but only that he “should raise it up at the last day.” When St John calls him a propitiation for our sins, which, as we have seen, the divines whose doctrine we are now stating hold him to be indirectly, he does not add, as in our translation, for the *sins* of the whole world, but *περι όλου του κόσμου*, for the whole world, which, by his death, he redeemed from that vanity

and corruption under which, according to St Paul, it had groaned from the fall till the preaching of the gospel. Hence it is that our blessed Lord calls himself “the resurrection and the life,” and always promises to those who should believe in him that though they were dead, yet should they live, and that he would raise them up at the last day.

Among these various opinions respecting the destination of the death of Christ, it belongs not to us to decide. The serious reader, divesting himself of prejudice in favour of the system in which he has been educated, will search the scriptures, and adopt the theory which he shall find most explicitly taught in that sacred volume; but as in every system it is admitted, that *one purpose* for which Christ died was to redeem mankind from the everlasting power of the grave, and bring to light life and immortality, it is of the utmost importance to know whether that purpose has been fully attained. Death we see still triumphing over all the generations of men; and as the scriptures give us no hopes of being rescued from its dominion but through the medium of a resurrection, some sensible evidence seems necessary to evince that a general resurrection shall actually take place. This we are promised as one great benefit purchased for us by the sufferings of Christ sacrificed on the cross. And since the price has been *paid*, and paid thus *visibly*, the nature of the covenant requires that the benefit should be as *visibly enjoyed* by the person whose sufferings obtained it for his brethren. “If the Redeemer himself had not been seen to enjoy the fruits of the redemption procured, what hopes could have remained for the rest of mankind? Would not the natural conclusion have been, that the expedient of *redemption*, by the death and sacrifice of Jesus, had proved ineffectual?” This is the conclusion which St Paul himself draws: “If Christ be not risen (says he *), then is our preaching vain, and your faith is also vain; ye are yet in your sins. Then they also, who are fallen asleep in Christ, are perished—*απώλοντο*—are lost, as if they had never existed. But now (adds he) is Christ risen from the dead, and become the first fruits of them that *slept*. For since by man came *death*, by man came also the *resurrection* of the dead: For as in Adam *all die*, even so in Christ shall *all be made alive*.”—So necessarily connected, in the opinion of the apostle, is the resurrection of Christ with the very essence of Christianity †.

Though we have in another place (see RESURRECTION, n° 50.) stated such arguments for the truth of this fundamental article of our common faith, as must carry conviction to every mind capable of estimating the force of evidence; yet as attempts are daily made, sometimes openly and sometimes with the most insidious art, to propagate in this nation the French doctrine concerning the eternal sleep of death (G), we trust that we shall not trespass on the serious reader's patience if we here resume the subject, and endeavour to show that it was absolutely impossible for the apostles to persuade the world, or to think of persuading the world, that their Master rose from the dead, if his resurrection was not real.

In the article MIRACLE *, we have said, that “the very resolution of the apostles to propagate the belief of false miracles in support of such a religion as that which is taught in

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One purpose for which Christ died was to bring to light life and immortality.

* 1 Cor. xv. 15—23.

† Warburton's Sermon on the Resurrection.

* Vol. XII. p. 173.

(G) Once we intended (see Vol. XVI. page 140. note A) to notice in this place some of the most recent of those attempts, and to expose them to that indignation with which, we trust, the good sense of our countrymen shall always treat such sophistical reasonings as have no other object than to diminish the sum of human happiness. On maturer reflection, however, it seems more expedient to state one decisive argument for the resurrection of Christ, which may be safely opposed to any new sophisms of our minute philosophers, when those which are at present in fashion shall have sunk through their own weakness into oblivion, or quietly retired with their authors to that place “Where Tindal dictates and Silenus scores.” *Dunciad*.

Theology, in the New Testament, is itself as great a miracle as human imagination can easily conceive." We shall illustrate this position by the resurrection of Jesus, which we are to suppose the apostles resolving to publish as an unquestionable fact, whilst they were conscious that they themselves stole the body from the sepulchre; and saw it in their custody under the dominion of death. On such an enterprise they could not enter without much deliberation; and we may conceive him, to whom the thought of propagating this fable first occurred, addressing his companions in some such terms as the following:—

189 The truth of his resurrection demonstrated.
 "The Master whom we served is now no more, and the magnificent hopes which we had formed with respect to him and to ourselves are blasted by his death. The time which he fixed for his resurrection is passed; and it is folly to cherish any expectation of that event, as we see his body which we stole a prey to corruption. We must therefore either separate and return to our former professions, the obscurity of which will screen us from the disgrace of having been deceived; or, remaining united, take the generous resolution of supporting our glory, by saying to every body, that our Master is risen from the dead, and is the true Messiah expected by our nation, and foretold by the prophets. To return to our professions would be cowardly and mean; to propagate the story of the resurrection will be attended with infinite difficulty and danger; but to despise danger and to conquer difficulties, is worthy of great souls such as ours; and therefore I take it for granted that this is the part which you have all resolved to act.

* St. Luke x. 1—18.
 † St. Matth. xxvii. 55, 56. St. Luke xxiii. 55, 56. xxiv. 1—12.
 "To succeed in our glorious enterprise, it will be absolutely necessary to admit into our most secret counsels, not only the seventy disciples whom our Lord sent before him, in pairs, into every city and place which he visited*, but also that crowd of women† who followed him from Galilee, were present at his crucifixion, and visited his sepulchre; for all these persons are so intimately acquainted with every circumstance of his life and death, that they have it in their power completely to defeat our project in spite of our utmost art; and that power, it cannot be doubted, they will exert, unless admitted to share with us the glory of deceiving the world. The task which they and we have to perform is no ordinary one; for we must all speak the same things, and things which each of us knows to be false. Yet we must advance them with an air so intrepid as to remove suspicion, and be able to bury in profound secrecy the resolutions which in concert we take to-day.

"No truth can be so deeply impressed upon our minds as that our Master continues under the dominion of death; and we all know that truth stands so ready at the door of the lips, that the greatest liar among us has hitherto uttered a thousand truths for one falsehood (H); but henceforth, on this most interesting subject, we must never let a single truth escape us either in our most unguarded moments or when put to the torture; for all will be lost, if any one person in whom we may place confidence shall reveal to our enemies what should be known to ourselves alone. It is therefore necessary to foresee all that is capable of extorting secrets from such persons as are not like us proof against every thing. We shall be exposed to much bad treatment, to prisons, to severe examinations, to death itself, and even to the most cruel and lingering kinds of death, sufficient to shake any but the most invincible resolutions. All this

should be foreseen, and must be despised by every person among us, man and woman!

"But I must forewarn you, that under the greatest tortures we are not to hope for the smallest support from the testimony of a good conscience and the prospect of a future reward; for the very cruellest of our sufferings will arise from the remorse of conscience, unless we fortify ourselves against it by the most determined resolution. Others have indeed been wonderfully supported under violent and tedious sufferings, by the internal persuasion that they suffered for truth and righteousness sake; but as we are called upon to give new proofs of courage by suffering for what we know to be an impious falsehood, every reflection which tended to support them will torment us, and tempt us, in the most forcible manner, to betray our cause. From him, for whom we are to suffer and be sacrificed, we have nothing to expect; for since he could neither rescue himself from the violence of his enemies, nor fulfil his promise of rising from the dead, it would be madness to suppose that he will deliver us from our persecutors, or afford us the smallest consolation when sinking under the cruellest tortures which malicious ingenuity can invent. He was a deceiver, and has deceived us. He promised, a few hours before he was taken, that he would rise from the dead and go before us into Galilee; but God has ordered things otherwise; and as he is supreme Lord, we are not to sound his judgments, or even to think too much of them.

"You seem astonished at this counsel! It is new indeed, but necessary; and necessary to such a degree, that all our designs will prove abortive if we suffer the fear of God to get possession of our minds, and make us timid and pusillanimous in the testimony which we are determined to give against him, by maintaining that he raised from the dead a man whom he has without doubt condemned as an usurper of the glory which was not his due. Such assertions in favour of falsehood will no doubt cost us something in the beginning; but we must endeavour to make ourselves as easy as we can, by imprinting strongly on our minds how glorious and disinterested it will be to suffer without hope either from God or man, and even with the certainty of being punished both by God and man, not only in this life, but eternally in the next, if there be another. For let me not attempt to conceal from you, that present and future misery must be our inevitable portion; and that we must therefore become inaccessible to fear, even to such fear as religion itself ought to inspire, or return ignobly to our nets and boats; there is absolutely no other alternative. He whom we lament has not only assumed openly the character of the Messiah, but has dared even to call himself the Son of God; and though we have seen him ready to be stoned for these pretensions, and cannot doubt but that God was highly provoked at them, we must, in defiance of the divine vengeance, undertake to make them good, or at least cause him to be worshipped as the Son of God; whom to our own knowledge God has expressly disavowed. This might frighten timid and vulgar souls; but we must have none such among us. All the men and women of our company must be capable of braving Omnipotence, and of deriving new vigour and resolution from the prospect of uninterrupted misery.

"Let us now consider how this great design is to be carried into execution; for it would be the excess of folly to enter upon

(H) To the most illiterate fisherman of Galilee this must have been known as a *fact*; for no man can speak an intelligible sentence without uttering a truth or a falsehood, and surely every man speaks a thousand sentences for one in which he either utters or intends to utter a falsehood. How he must necessarily do so, we have shown in another place. See METAPHYSICS, n° 135, &c.

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stian.

upon it without preparing the means of success. First of all, we will draw up together a history of the pretended apparitions of our common Master. Those who have the best inventions shall be employed in it; the rest of us shall revise and correct the work; and all must strongly imprint on their memories the pretended facts and discoveries which shall be agreed upon; because we must never think of retracting, and the least contradiction in our evidence would be of fatal consequence (1). To this labour we must join another, which requires more knowledge of the Scriptures than we possess; but we will supply our deficiencies by study. Our rulers, and indeed our countrymen in general, expect that the Messiah shall be a great and invincible hero; that he shall deliver his country from the dominion of the Romans; that he shall conquer all nations, and establish on earth an universal monarchy, of which Jerusalem is to be the capital. As such (they say) he is foretold by the prophets; but the person whom we mean to impose upon them as the Messiah, expressly disclaimed all worldly greatness, and made the sufferings of himself and his followers one test of the truth of his pretensions to the character which he assumed. Some of the most subtle among us therefore must carefully examine the books of Moses, the Psalms, and the Prophets, and wrest all the prophecies of the true Messiah in favour of him whom we know to be an impostor. The enterprise, as it is directly opposed, not only by truth, but also by all the prejudices and hopes of the nation, is indeed bold: but what is the whole of our design but the excess of boldness?

"We have hitherto believed that the religion of our forefathers is true, and was given by God to Moses. It is certainly the most ancient, the most authorized, the purest religion in the world; and the only one founded on divine revelation, or that boasts of such a foundation. But if we are to preach to the whole world, that our Master, whom we know to be an impostor, is the true and only Messiah; and if we are to apply to him prophecies which have another object, we must necessarily despise this most ancient religion, which our fathers and we have hitherto deemed divine and incontrovertible; and this is the ultimate point to which it has been my aim to bring you. I desire not that you should consent immediately, for to abandon one's religion is a thing which should not be done without maturely weighing the consequences; but what I desire is, that you will diligently compare all the parts of the plan which I have suggested to you, examine their strict and necessary union, and satisfy yourselves completely, that we must adopt the whole or reject the whole; for it is obvious that modifications and exceptions are here absolutely impossible.

"I hope you will not deliberate long on my proposal; for we shall have much to do after your resolution is formed, and the time in which I propose to concert and finish the whole scheme is very short. We have but the interval betwixt the present moment and the feast of Pentecost in which to prepare the order of false apparitions, and fix it in the memories of our numerous coadjutors, male and female; to study in the Scripture all that relates to the Messiah; to form the plan and adjust the parts of a new religion;

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(1) Deistical writers have laboured strenuously, though in vain, to find such contradictions in the different accounts of the circumstances attending the resurrection as may discredit the evidence of the evangelists to the principal fact.—This gave occasion to Mr West's admirable *Observations on the Resurrection*; and were there any candour or modesty among our minute philosophers, the appearance of that book would have silenced them for ever. This, however, it has not done. The old cavils have, without the least notice of Mr West, been again brought forward by Thomas Paine, and again obviated by the Bishop of Landaff in his masterly *Apology for the Bible*. "If the writers of the Gospels (says Paine) had gone into any court of justice to prove an *alibi* (for it is of the nature of an *alibi* that is here attempted to be proved, namely, the absence of a dead body by supernatural means), and had given their evidence in the same contradictory manner as it is here given, they would have been in danger of having their ears cropt for perjury, and would have justly deserved it." In reply to this impious sarcasm, the right reverend apologist thus addresses its author: "As we cannot have this *viva voce* examination of all the witnesses, let us call up and question the evangelists as witnesses to a supernatural *alibi*.—Did you find the sepulchre of Jesus empty? One of us actually saw it empty, and the rest heard from eye-witnesses that it was empty.—Did you, or any of the followers of Jesus, take away the dead body from the sepulchre? All answer, No.—Did the soldiers, or the Jews, take away the body? No.—How are you certain of that? Because we saw the body when it was dead, and we saw it afterwards when it was alive.—How do you know that what you saw was the body of Jesus? We had been long and intimately acquainted with Jesus, and knew his person perfectly.—Were you not affrighted, and mistook a spirit for a body? No; the body had flesh and bones; we are sure that it was the very body which hung upon the cross, for we saw the wound in the side, and the print of the nails in the hands and feet.—And all this you are ready to swear? We are; and we are ready to die also, sooner than we will deny any part of it.—This is the testimony which all the evangelists would give, in whatever court of justice they were examined; and this, I apprehend, would sufficiently establish the *alibi* of the dead body from the sepulchre by supernatural means."

"The book of Matthew (says Paine) continues its account, that at the end of the Sabbath, as it began to dawn, towards the first day of the week, came Mary Magdalene and the other Mary to see the sepulchre. Mark says it was sun-rising, and John says it was dark. Luke says it was Mary Magdalene, and Joanna, and Mary the mother of James, and other women, that came to the sepulchre. And John says that Mary Magdalene came alone. So well do they agree about their first evidence! they all appear, however, to have known most about Mary Magdalene; she was a woman of a large acquaintance; and it was not an ill conjecture that she might be upon the stroll."

"This (replies the Bishop) is a long paragraph, and I will answer it distinctly: First, There is no disagreement of evidence with respect to the time when the women went to the sepulchre; all the evangelists agree as to the day on which they went; and as to the time of the day, it was early in the morning: what court of justice in the world would set aside this evidence as insufficient to substantiate the fact of the women having gone to the sepulchre, because the witnesses differed as to the degree of twilight which lighted them on their way? Secondly, There is no disagreement of evidence with respect to the persons who went to the sepulchre. John states that Mary Magdalene went to the sepulchre; but he does not state, as you make him state, that Mary Magdalene went alone; she might, for any thing you have proved or can prove to the contrary, have been accompanied by all the women mentioned by Luke. Is it an unusual thing to distinguish by name a principal person going on a visit or an embassy, without mentioning his subordinate attendants?"

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 tion; to efface in our mind all traces and ideas of the ancient one; and to fortify ourselves against our prejudices, our fears, and our worldly interests: for we must get quit of all these, since we are going most generously to renounce all the goods of this life, and all the hopes of the next.—What makes me choose the feast of Pentecost for our first public appearance in our new capacity, is the great concourse of people from all nations which will be then at Jerusalem; for it will be a favourable opportunity to preach to them the resurrection of him whom our rulers have crucified, and by their means to spread the news quickly over the whole world. We are ignorant indeed of foreign tongues, and we are without interpreters; but our presence will suffice. Some will comprehend by signs what we would say to them, and others, who hear and understand our language, will assist them. We cannot, it is true, work a miracle; but was there ever such a miracle thought of as our daring to resist all that is mighty and respectable in our nation? There would perhaps be more prudence in not appearing altogether; and as we have nothing extraordinary or divine to command respect, nor any protection to hope from God or man, in not exposing ourselves in a body on the first day of our enterprise; but in a design like ours, singular in its whole nature, and contrary to common rules, of what use would prudence be? I am sure that with our Galilean pronunciation, and with the goodly appearance that we shall make in our fishermen's garments, we shall persuade a multitude of people. Nay, so confident am I of our success, that I include in my design not only Judea but all the nations upon earth. Nor shall I be discouraged by the diversity of religions, manners, and tongues, which prevail in the world; be affrighted by the hostile power of all mankind; or have my zeal in the least abated for him who hath deceived us, by the improbability of being able to make the Gentiles, who know nothing of the Scriptures or the Messiah, adore as the Son of God the man whom the Jews have crucified as an impostor.

"In the mean time, it will be proper to accustom ourselves to the most inhuman spectacles, in order to arrive by degrees at such a hardness of heart as nothing can be sup-

posed to move. You may depend upon it, that we shall see multitudes of people, seduced by our discourses, proscribed, banished, thrown into dark prisons, torn in pieces by engines of torture, condemned to wild beasts, to the fire, and to the most shameful and insupportable punishments, for preaching with us the resurrection of Jesus. Now, as we are all by nature inclined to compassion, we might be tempted to relieve them from such exquisite misery, since we could effectually do it by a single word; but this word, which would discover the whole mystery, must never slip from our mouths. There must not be so much as one sigh or one groan to betray us. Instead of unreasonably reproaching ourselves with our imposture by which we deceived them, we must applaud ourselves for their seduction; we must place our own joy in their wretchedness; and we must not be afraid to honour, and cause them to be honoured, as illustrious witnesses of the truth, though we know them to be only martyrs to our hypocrisy, and to their own facility in believing falsehood *."

This is a faithful view of the outlines of that plan which *must have been formed* by the apostles, if they intended to deceive the world with respect to the resurrection of their Master. It is of no consequence to the argument whether it grew gradually out of the joint deliberations of the whole body, or was completely digested, as we have supposed, by one of the number, and implicitly adopted by the rest: it is enough that every circumstance which we have mentioned must have occurred to them, and that every resolution must have been unanimously adopted which we have made to flow from the mouth of this daring orator. But surely the bare recital of such an oration is sufficient to show the impossibility of carrying into effect so absurd, so horrible, and so impious a measure—a measure diametrically opposite to all the principles and motives of human actions.

Archbishop King has supposed *, that the human will is a faculty distinct from the understanding and the appetites; that activity is essential to it; and that previous to an election formed, it is equally indifferent to all objects. He thence infers, that a man may choose, and even take delight in, what is not naturally agreeable to any of his appetites; because

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* See the Principles of the Christian Religion translated by Mr Lally.

* Origin of Evil, 4th edit. ch. 5. sect. 1. sub-sec. 3. and 4.

dants? Thirdly, In opposition to your insinuation, that Mary Magdalene was a common woman, I wish it to be considered whether there is any scriptural authority for that imputation; and whether there be or not, I must contend, that a repentant and reformed woman ought not to be esteemed an improper witness of a fact. The conjecture which you adopt concerning her is nothing less than an illiberal, indecent, unfounded calumny, not excusable in the mouth of a libertine, and intolerable in your's.

"The book of Matthew (continues Paine) goes on to say: 'And behold there was an earthquake, for the angel of the Lord descended from heaven, and came and rolled back the stone from the door, and sat upon it;—but the other books say nothing about any earthquake.'—What then? does their silence prove that there was none?—'Nor about the angel rolling back the stone and sitting upon it.'—What then? does their silence prove that the stone was not rolled back by an angel, and that he did not sit upon it?—'And according to their accounts there was no angel sitting there.'—This conclusion (says his Lordship) I must deny; their accounts do not say there was no angel sitting there at the time that Matthew says he sat upon the stone. They do not deny the fact, they simply omit the mention of it; and they all take notice that the women, when they arrived at the sepulchre, found the stone rolled away: hence it is evident that the stone was rolled away *before* the women arrived at the sepulchre; and the other evangelists, giving an account of what happened to the women *when* they reached the sepulchre, have merely omitted giving an account of a transaction previous to their arrival. Where is the contradiction? What space of time intervened between the rolling away the stone and the arrival of the women at the sepulchre, is nowhere mentioned; but it certainly was long enough for the angel to have changed his position; from sitting on the outside he might have entered into the sepulchre; and another angel might have made his appearance, or, from the first, there might have been two, one on the outside rolling away the stone, and the other within. Luke, you tell us, 'says there were two, and they were both standing; and John says there were two, and both sitting.'—It is impossible, I grant, even for an angel to be sitting and standing at the same instant of time; but Luke and John do not speak of the same instant, nor of the same appearance.—Luke speaks of the appearance to all the women; and John of the appearance to Mary Magdalene alone, who tarried weeping at the sepulchre after Peter and John had left it. But I forbear making any more minute remarks on still minuter objections, all of which are grounded on this mistake—that the angels were seen at one particular time, in one particular place, and by the same individuals."

Theology, cause when the choice is made, a relation is formed between the will and the object of choice, which, from being originally indifferent, now becomes a favourite object. But neither his Grace, nor any other asserter of human liberty, has ever affirmed or supposed, that any man or body of men could deliberately choose evil for its own sake, or enter zealously upon a tedious and difficult enterprise, from which no good could possibly arise, and from which unmixed misery was clearly foreseen as the necessary result of every step of the progress. Such, however, must have been the choice and the conduct of the apostles, when they resolved to preach a new religion founded on the resurrection of Jesus, if they did not certainly know that Jesus had risen from the dead. And this conduct must have been adopted, and in opposition to every motive which can influence the human mind; have been persevered in by a great number of men and women, without the smallest contradiction having ever appeared in the various testimonies, which at different times, and under the cruellest tortures, they all gave to a variety of circumstances, of which not one had its foundation in truth. He who can admit this supposition, will not surely object to the incredibility of miracles. The resurrection of a man from the dead is an event so different indeed from the common course of things, that nothing but the most complete evidence can make it an object of rational belief; but as the resurrection of Jesus has always been said to have had God for its Author, it is an effect which does not exceed the power of the cause assigned, and is therefore an event possible in itself and capable of proof. It is a deviation from the laws of nature, but it is not contradictory to any one of those laws.

That a great number of men and women should deliberately form a plan of ruin and misery to themselves, without a prospect of the smallest advantage either in this world or in the next, is as different from the common course of things as the resurrection from the dead; and therefore in itself at least as great a miracle: but that they should persist in prosecuting this plan in the midst of torments; that they should spread themselves over the whole world, and everywhere publish a number of falsehoods, without any one of them contradicting the rest; that truth should never escape them either in an unguarded moment, or when lingering on the rack, and yet that all their lies should be in perfect agreement with each other; that they should every one of them court sufferings for a person whom they knew to be an impostor; that not one of the number—not even a single woman—should have so much compassion for a fellow-creature, as to rescue him from the flames by confessing a truth which could injure nobody—not even the suffering deceivers themselves;—all this is not only different from the common course of things, but directly contrary to the most known laws of nature, and is therefore not miraculous, but may be pronounced impossible. Yet this impossibility we must admit, or acknowledge, that as “Christ died for our sins, according to the Scriptures, and was buried; so he rose again the third day according to the Scriptures; that he was seen of Cephas, then of the twelve; after that of above five hundred brethren at once; after that of James; then of all the apostles; and that he was last of all seen of St Paul*,” who was converted by the vision to preach the faith which till then he had persecuted.

Thus are we assured, that “those who have fallen asleep in Christ are not lost, since he is risen from the dead, and become the first fruits of them that slept. For since by man came death, by man came also the resurrection of the dead. For as in Adam all die, even so in Christ shall all be made alive. But every man in his own order: Christ the first-fruits, afterwards they that are Christ’s at his coming; for

all that are in the graves shall hear his voice, and shall come forth; they that have done good unto the resurrection of life, and they that have done evil to the resurrection of damnation*.”

Our blessed Lord having conversed familiarly with the eleven apostles for forty days after his resurrection, instructing them in the things pertaining to the kingdom of God; having extended their authority as his ministers, by giving them a commission to teach all nations, and make them his disciples, by baptizing them in the name of the Father, and of the Son, and of the Holy Ghost; and having promised them power from on high to enable them to discharge the duties of so laborious an office—led them out as far as Bethany, that they might be witnesses of his ascension into heaven. “When they therefore were come together, they asked of him, saying, Lord, wilt thou at this time restore again the kingdom to Israel? And he said, it is not for you to know the times and the seasons, which the Father hath put in his own power. But ye shall receive power after that the Holy Ghost is come upon you; and ye shall be witnesses unto me, both in Jerusalem, and in all Judea, and in Samaria, and unto the uttermost parts of the earth. But tarry ye in the city of Jerusalem, until ye be endued with power from on high; and he lift up his hands and blessed them; and it came to pass while he blessed them, he was parted from them, and a cloud received him out of their sight. And while they looked stedfastly towards heaven, as he went up, behold, two men stood by them in white apparel; who also said, ye men of Galilee, why stand ye gazing up into heaven? This same Jesus, who is taken up from you into heaven, shall so come, in like manner as ye have seen him go into heaven. And they worshipped him, and returned to Jerusalem with great joy §.”

That our blessed Lord ascended into heaven, will hardly be denied in the present age by any one who admits that he rose from the dead. The ascension was indeed the natural consequence of the resurrection; for we cannot suppose that a man would be called back from the grave to live for ever in a world where all other men fall in succession a prey to death. The purpose for which he died was to recover for the descendants of Adam every privilege which they had forfeited through his transgression; and if, as has been generally believed, mankind were by the terms of the first covenant to enjoy eternal life in heaven, some proof was necessary that Christ by his death and resurrection had opened the kingdom of heaven to all faithful observers of the terms of the second. Hence it was prophesied § of the Messiah, in whom all the nations of the earth were to be blessed, that “he should ascend on high, lead captivity captive, and sit on the right hand of God until his enemies should be made his footstool.” It was therefore of the greatest importance to the apostles to have sufficient proof of their Master’s exaltation to the right hand of the Majesty on high; for otherwise they could neither have looked for an entrance into heaven themselves, by a new and living way, as the author of the epistle to the Hebrews expresses it, nor have preached Jesus as the Messiah promised to their fathers, since they could not have known that in him these prophecies were fulfilled. But the proof vouchsafed them was the most complete that the nature of the thing would bear. The spectators of the ascension were many; for, according to the history of St Luke*, those who returned from the Mount of Olives to Jerusalem, and prepared themselves for the coming of the Holy Ghost, were in number about six score; and to such a cloud of witnesses the evangelist would not have appealed, had not the fact he was recording been very generally known. Yet these were perhaps but part of the witnesses; for since Christ had told to his disciples that he was to ascend

* 1 Cor.
xv. 3—9.
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Hence we
are assured
of our own
resurrection.

§ St Luke

xxiv. 49—

53. and

Acts i. 6—

12.

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Proofs of

Christ’s as-

cen-

sion.

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 cend to his Father and their Father, to his God and their God, and that he was going to prepare a place for them, that where he is there they might be likewise; we can hardly doubt but that all who believed in him as the Redeemer of the world would take care to be present, not only to view their Master's triumph over all his enemies, but also to have a sight of that glory which awaited themselves. It was on this occasion probably that he was seen after his resurrection by above five hundred brethren at once, of whom the greater part were alive at the writing of St Paul's first epistle to the Corinthians.

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 In heaven
 our Savi-
 our ex-
 ecutes the
 office of a
 priest
 * Heb. ix.
 24.
 193
 And a king.
 † 1 Peter
 iii. 22.
 † St
 Mat. h.
 xviii. 18.
 † Phil. ii.
 8, 9, 10.
 But though such multitudes of people saw Jesus lifted up from the mount, and gradually vanish out of their sight, some other evidence seemed necessary to certify them of the place to which he had gone. Two angels therefore appear, and attest what human eyes could not see, but what was indeed the consequence of what they had seen. They attest that Christ had ascended to heaven, not to descend again till the last day; and surely, with respect to this point, the citizens of heaven were the most unexceptionable witnesses. We must therefore acknowledge and confess, against all the wild heresies of old (κ), that Jesus Christ the Son of God, who died and rose again, did with the same body and soul with which he had lived upon earth ascend up "into heaven, there to appear in the presence of God for us *." Having in the outward tabernacle of this world once offered up himself a pure and perfect sacrifice for the expiation of our sins, he entered within the veil into the most holy place, there to present his blood before God himself, in order to obtain mercy for us, and restore us to the Divine favour. So that, "if any man sin, we have an advocate with the Father, Jesus Christ the righteous, who is the propitiation for our sins, and not for ours only, but also for the sins of the whole world; and he is able to save to the uttermost those that come to God by him, seeing he ever liveth to make intercession for us." "Seeing then that we have a great high-priest, who is passed into the heavens, Jesus the Son of God, we may through him come boldly unto the throne of grace, that we may obtain mercy, and find grace to help in time of need."

But it is not the office of a priest only that our Lord discharges in heaven; he is represented as sitting on the right hand of God, to denote that regal authority with which he is now vested; "angels, and authorities, and powers, being made subject to him †." Hence it is, that after his resurrection, he said of himself †, "all power is given unto me in heaven and in earth;" for, as St Paul informs us †, "because he humbled himself and became obedient unto death, even the death of the cross, therefore God hath highly exalted him, and given him a name which is above every name; that at the name of Jesus every knee should bow, of things in heaven, and things in earth, and things under the earth." And this submission is due to him, because "God raised him from the dead, and set him at his own right hand in the heavenly places, far above all principalities and powers, and might, and dominion, and every name that is named, not only in this world, but also in that which is to come; and hath put all things under his feet, and gave him to be head over all things to the church *." As God, Christ possessed a kingdom, which, as it had not a beginning, can never have an end: but the dominion, of which the apostle is here treating, was conferred upon him as the mediator of the new covenant, and will no longer continue than till his enemies shall be subdued; for we are told, that "he must reign till he hath put all enemies under his feet; and that the last enemy which shall be destroyed is death." "He will ransom his subjects from the power of the grave; he will redeem them from death. O death, he will be thy plague; O grave, he will be thy destruction ‡." The trumpet shall sound, the graves shall be opened, all the sons and daughters of Adam shall return to life, and death shall be swallowed up in victory. "Then cometh the end, when the office of mediator ceasing, he shall have delivered up the kingdom to God, even the Father, when he shall have put down all rule and all authority and power. For when all things shall be subdued unto him, then shall the Son also himself be subject unto him that put all things under him, that God may be all in all ||."

Theology, more peculiarly Christian.
 * Eph. i. 20, &c.
 † Hosea xiii. 14.
 ‡ 1 Cor. xv. 24—28.
 194
 Descent of the Holy Ghost on the apostles.
 † John xvi. 7.
 * Acts ii. 1—13.
 That those who heard the apostles speak so many different

The first conspicuous proof which our blessed Lord gave of being vested with supreme power, and made head over all things to the church, was on the day of Pentecost. He had told the apostles that he would pray the Father to give them another comforter, who should abide with them for ever, even the Spirit of truth, which should teach them all things, and bring all things to their remembrance which he had said unto them. He had assured them, that it was expedient for them that he himself should go away; "for if I go not away (said he †), the Comforter will not come ‡ unto you; but if I depart, I will send him unto you." At his last interview with them, just before his ascension, he had desired them to tarry at Jerusalem till they should be endued with power from on high, before they entered upon their great work of converting the nations. These promises were amply fulfilled; for "when the day of Pentecost was fully come, they were all with one accord in one place. And suddenly there came a sound from heaven as of a rushing mighty wind, and it filled all the house where they were sitting. And there appeared unto them cloven tongues, like as of fire, and it sat upon each of them. And they were all filled with the Holy Ghost, and began to speak with other tongues, as the Spirit gave them utterance. And there were dwelling at Jerusalem Jews, devout men, out of every nation under heaven. Now when this was noised abroad, the multitude came together, and were confounded, because that every man heard them speak in his own language. And they were all amazed, and marvelled, saying one to another, Behold, are not all these who speak Galileans? And how hear we every man in our own tongue, wherein we were born? Parthians, and Medes, and Elanites, and the dwellers in Mesopotamia, and in Judea, and Cappadocia, in Pontus and Asia, Phrygia and Pamphylia, in Egypt and in the parts of Libya about Cyrene, and strangers of Rome, Jews and proselytes, Cretes and Arabians—we do hear them speak in our tongues the wonderful works of God. And they were all amazed, and were in doubt, saying one to another, What meaneth this *?"

3 P

ferent

(κ) There was one Apelles in the primitive church, who was condemned as a heretic for teaching that Christ's body was dissolved in the air, and that he ascended to heaven without it. The opinions of this man and his followers are stated at large and confuted by Tertullian, Gregory Nazianzen, and Epiphanius; and the reader who thinks such ridiculous notions worthy of his notice, will find enough said of them in the Notes to the sixth article of Pearson's Exposition of the Creed. Perhaps it may be from a hint communicated in these Notes, that our great modern corrector of the evangelists has discovered, if it be indeed true that he pretends to have discovered, that Jesus Christ is still upon earth.

Theology, more peculiarly Christian.

195
Certainty of that miracle.

ferent languages were amazed, is what we should naturally suppose; but that a single individual among them remained unconvinced, is astonishing: for the gift of tongues on the day of Pentecost is one of the most palpable miracles that was ever wrought. It is likewise one of the best authenticated miracles; for the book entitled *the Acts of the Apostles* was written not more than 30 years after the event took place (see SCRIPTURE, n° 168.); and it is not conceivable that, within so short a period, St Luke, or any man of common sense, would have appealed for the truth of what he recorded to so many inveterate enemies of the Christian name, had he not been aware that the miraculous gift of tongues was a fact incontrovertible. We all know how desirous the Jewish rulers were to stop the progress of the faith, by whatever means, whether of fraud or force; but if this miracle was not really performed, they had now an opportunity of doing it effectually by means to which truth and honour would give their approbation. Thousands must have been alive in the city of Jerusalem who were men and women at the time when the apostles were said to have been thus suddenly inspired with the tongues of the Parthians, Medes, and Elanites, &c.; and as these foreigners were themselves either Jews by descent, or at least proselytes to the Jewish religion, surely the chief-priests would have found multitudes ready, both at home and abroad, to contradict this confident appeal of St Luke's, if contradiction had been possible. We read however of no objection whatever being made to this miracle. Some of the audience, indeed, when the apostles addressed people of so many nations in all their respective languages, not understanding what was said, and taking it for jargon which had no meaning, concluded, not unnaturally, that the speakers were full of new wine, and mocked them for being drunk so early in the day; but this is a circumstance which, so far from rendering the miracle doubtful, adds much to the credit of the historian, as it would hardly have occurred to the writer of a narrative wholly false, and would certainly not have been mentioned, had he known that the apostles really attempted to impose upon the multitude unmeaning sounds for foreign languages.

196
The gift of tongues permanent with the apostles.

† Dr Middleton and Lord Shaftesbury.

197
Objections
* Middleton's Essay on the Gift of Tongues.

As it is thus certain that the apostles were miraculously furnished with the gift of tongues, so the elegance and propriety of that miracle to attest the real descent of the Spirit of truth, who was to teach them all things, and endue them with power from on high to convert the nations, can never be enough admired by the pious Christian; for words being the vehicle of knowledge, an ability to speak the different languages of the earth was absolutely necessary to enable those who had been originally fishermen to go into all the world and preach the gospel to every creature. Yet there have been writers †, who, though unable to call in question the reality of the gift of tongues on the day of Pentecost, have contended, that it was a gift "not lasting, but instantaneous and transitory; not bestowed upon them for the constant work of the ministry, but as an occasional sign only, that the person endowed with it was a chosen minister of the gospel; which sign, according to them, ceased and totally vanished as soon as it had served that particular purpose." The chief argument upon which this opinion is attempted to be built, is drawn from the Scripture Greek, which is said to be "utterly rude and barbarous, and abounding with every fault which can possibly deform a language; whereas we should naturally expect to find an inspired language pure, clear, noble, and affecting, even beyond the force of common speech; since nothing can come from God but what is perfect in its kind. In short, we should expect, says the objector, the purity of Plato and the eloquence of Cicero *."

In reply to this objection, it has been well observed †, that it supposes what is called the purity, elegance, and sublimity, of language, to be something natural and essential to human speech, and inherent in the constitution of things.

But the matter is far otherwise. These qualities are accidental and arbitrary, and depend on custom and fashion; modes of humanity as various as the differing climes of the earth; and as inconstant as the tempers, genius, and circumstances, of its inhabitants. For what is *purity*, but the use of such terms and their combinations as the caprice of a writer or speaker of authority hath preferred to their equals? what is *elegance*, but such a turn of idiom as a fashionable fancy hath brought into credit? and what is *sublimity*, but the application of such images as arbitrary and casual connections, rather than their own native grandeur, have dignified and ennobled? The consequence of this is, that the mode of composition which is a model of perfection to one nation or people, has always appeared either extravagant or mean to another. Asiatic and Indian eloquence was esteemed hyperbolical and unnatural by the Greeks and Romans, and is so esteemed by us; whilst the Greek and Roman eloquence in its turn appeared cold and insipid to the warm inhabitants of the east; and ours would appear perhaps still colder. But the New Testament was designed for the rule of life to all mankind. Such a rule required inspiration; and inspiration, say the objectors, implies the most perfect eloquence. What human model then was the Holy Ghost to follow? for a human model it must have been, because there was no other; and if there had, no other would have answered the purpose, which was to make a due impression on the mind and affections. Should the eastern eloquence have been employed? But it would have been too swelling and animated for the west. Should the western? This would have been too still and inactive for the east. Or suppose us only solicitous for what we best understand; which species of this latter genus should the sacred writers have preferred? The dissolute softness of the Asiatic Greeks, or the dry conciseness of the Spartans? The flowing exuberances of Attic eloquence, or the grave severity of the Roman?

"But are there not some general principles of eloquence in common to all the species? There are. Why then should not these have been employed to credit the apostolic inspiration? Because the end even of these (replies our author) is to mislead reason, and inflame the passions; which being abhorrent to the truth and purity of our holy religion, were very fitly rejected by the inspired penman. Besides, it might easily be known to have been the purpose of Providence, though such purpose had not been expressly declared, that the gospel should bear all possible marks of its divine original, as well in the course of its progress as in the circumstances of its promulgation. To this end, the human instruments of its conveyance were mean and illiterate, and chosen from among the lowest of the people, that when the world saw itself converted by the *foolishness of preaching*, as the only learned apostle thinks fit to call it, unbelievers might have no pretence to ascribe its success to the parts, or stations, or authority, of the preachers. Now had the language inspired into these illiterate men been the eloquence of Plato or Tully, Providence would have appeared to counteract its own measures, and to defeat the purpose best calculated to advance its glory. But God is wise, though man is a fool. The course of Providence was uniform and constant: It not only chose the weakest instruments, but carefully kept out of their hands that powerful weapon of words which their adversaries might so easily have wrested to the dishonour of the gospel. Common sense tells us, that the style of an universal law should retain

Theology, more peculiarly Christian.

† Warburton's Doctrine of Grace.
198
Answered.

Theology, tain what is common to all languages, and neglect what is more peculiar to each. It should retain nothing but **CLEARNESS** and **PRECISION**, by which the mind and sentiments of the writer are intelligibly conveyed to the reader. This quality is essential, invariably the same, and independent of custom and fashion. It is the consequence of syntax, the very thing in language which is least positive, as being formed on the principles of philosophy and logic: whereas all besides, from the very power of the elements and signification of the terms to the tropes and figures in composition, are arbitrary; and, as deviating from these principles, frequently vicious. But this quality of clearness and precision eminently distinguishes the writings of the New Testament; insomuch that it may be easily shown, that whatever difficulties occur in the sacred books do not arise from any imperfect information caused by this local or nominal barbarity of style; but either from the sublime or obscure nature of the things treated of, or from the intentional conciseness of the writers; who, in the casual mention of any thing not essential to the dispensation, always observe a studied brevity."

After much ingenious and sound reasoning on the nature of language in general, our author concludes, that the **STYLE** of the New Testament, even on the supposition of the truth of what has been said to its discredit, is so far from proving the language not to be divinely inspired, that it bears one certain mark of that original. "Every language consists of two distinct parts, the single terms, and the phrases and idioms. Suppose now a foreign language to be instantaneously introduced into the minds of illiterate men like the apostles; the impression must be made either by fixing in the memory the terms and single words only with their signification, as, for instance, Greek words corresponding to such or such Syriac or Hebrew words; or else, together with that simple impression, by enriching the mind with all the phrases and idioms of the language so inspired. But to enrich the mind with the peculiar phrases and idiom of a foreign language, would require a previous impression to be made of the manners, notions, fashions, and opinions, of the people to whom that language is native; because the idiom and phrases arise from and are dependent on these manners. But this would be a waste of miracles without sufficient cause or occasion; for the Syriac or Hebrew idiom, to which the Jews were of themselves enabled to adapt the Greek or any other words, abundantly served the useful purposes of the gift of tongues, which all centered in those tongues, being so spoken and written as to be **CLEARLY UNDERSTOOD**. Hence it follows, that if the style of the New Testament were indeed derived from that language which was miraculously impressed upon the apostles on the day of Pentecost, it must be just such a one as in reality we find it to be; that is, it must consist of Greek words in the Syriac or Hebrew idiom."

199
Divinity
of the Holy
Ghost.

The immediate author of this gift, so necessary to the propagation of the gospel, was the Spirit of truth, or the Comforter, who is the Holy Ghost and the third person in the blessed Trinity. That there are three persons in the one Godhead, has been shewn at large in a former section of this article; and that the Holy Ghost is one of these three, might be safely concluded from the form of baptism instituted by Christ himself. But as more plausible objections have been urged against his divinity than any that we have met with against the divinity of Christ, it may not be improper to consider these before we proceed to give an account of the graces which he imparted to the infant church, and of the apostles preaching under his influence. By the Arians the Holy Ghost is considered as a creature; by the Socinians and modern Unitarians, as they call themselves, the words *Holy Ghost* are supposed to express, not a

person or spiritual subsistence, but merely an energy or operation, a quality or power, of the Father, whom alone they acknowledge to be God. If this doctrine can be confuted, the Arian hypothesis will fall to the ground of itself; for it is not conceivable that any inspired teacher should command his followers to be baptized in the name of the self-existent God and two creatures.

Theology,
more pecu-
liarly Chri-
stian.

It is admitted by the Socinians themselves, that in the scriptures many things are spoken of the Holy Ghost which can be properly predicated only of a person; but the inference drawn from this concession they endeavour to invalidate by observing, that in scripture there are likewise expressions in which things are predicated of abstract virtues, which can be literally true only of such persons as practise these virtues. Thus when St Paul says *, that "charity * 1 Cor. suffereth long and is kind, charity envieth not, charity xiii. 4-8. vaunteth not itself, is not puffed up, &c." we cannot suppose his meaning to be, that these actions are performed by charity in the abstract, but that every charitable person, in consequence of that one Christian grace, suffereth long and is kind, envieth not, vaunteth not himself, and is not puffed up, &c. In like manner, say they, personal actions are attributed to the Holy Ghost, which itself is no person, but only the virtue, power, or efficacy, of God the Father; because God the Father, who is a person, performs such actions by that power, virtue, or efficacy, in himself, which is denominated the Holy Ghost. Thus when we read † † Acts x. that "the Spirit said unto Peter, Behold three men seek 19, 20. thee; arise therefore and get thee down, and go with them, doubting nothing, for I have sent them;" we must understand that God the Father was the person who spoke these words and sent the three men; but because he did so by that virtue in him which is called the *Spirit*, therefore the *Spirit* is said to have spoken the words and sent the men. Again, when "the Holy Ghost said || to those at Antioch, || Acts Separate me Barnabas and Saul for the work whereunto I xiii. 2. have called them;" we are to conceive that it was God the Father who commanded the two apostles to be separated for the work to which he had called them; but because he had done all this by that power within him which is called the Holy Ghost, therefore his words and actions are attributed to the Holy Ghost, just as long-suffering in men is attributed to charity.

This reasoning has a plausible appearance, and would be of much force were *all* the actions which in scripture are attributed to the Holy Ghost of such a nature as that they could be supposed to have proceeded from the person of God the Father in consequence of any particular power or virtue in him; but this is far from being the case. Thus "the Spirit is said † to make intercession for us;" but with † Rom. whom can we suppose God the Father, the fountain of di- viii. 26, vinity, to intercede? Our Saviour assured † his disciples, † St John that the Father would, in his name, send to them the Holy xiv. 26. Ghost, who is the Comforter; that he would himself send xv. 26. the Comforter unto them from the Father; that the Com- xvi. 13, 14, forter should not speak of himself, but speak only what he 15. should hear; and that he should receive of Christ's, and shew it unto them. But we cannot, without blasphemy and absurdity, suppose that the Father would, in the name of Christ, send himself; that the Son would send the Father from the Father; that the Father would not speak of himself, but speak only what he heard; or that either the Father in person, or a quality of the Father, should receive any thing of Christ to shew unto the apostles.

The sagacity of Socinus perceived the force of such objections as these to his notion of the Holy Ghost, being nothing more than the power of the Father personified; and therefore he invented another *prosopopeia* to serve his purpose

201
Answered.

Theology, purpose in the interpretation of those texts to which this more peculiarly Christian. one cannot be applied. "The Spirit of God (says he) may be considered either as a property or power in God, or as the things on which that power is working. When taken in the former sense, the Spirit, where any personal attribute is given to it, means God the Father; when taken in the latter sense, it means the man on whom the power of the Father is working; who, as long as he is affected by that power, is therefore called the Spirit of God;" and he quotes, we think most absurdly, the tenth verse of the second chapter of the first epistle to the Corinthians, as a text in which by the Spirit is meant an inspired man who could search all things, yea, even THE DEEP THINGS OF GOD.

§ Faust.
Socinus in
Resp. ad
Wickam,
cap. 10.

How his modern followers, who deny the plenary inspiration even of Christ, will relish such a degree of inspiration as this, which raises mere man to a temporary equality with God, we know not; but leaving them to settle the dispute with their master as they best can, we shall produce one or two passages in which personal attributes are given to the Spirit of God, when it is impossible to conceive that Spirit either as a power inherent in the Divine Father, or as the person on whom that power is operating. We need not bring new texts into view, as some of those already quoted will serve our purpose. When our Saviour promises that the *Holy Ghost, the Comforter, the Spirit of truth*, should be sent by the Father and the Son to the apostles, we have seen, that by this Spirit he could not mean the Father or a property of the Father; neither could he possibly mean the apostles themselves, unless we are to suppose that the Father and the Son sent St Peter to St Peter, and that St Peter, so sent, came to St Peter! Again, when Christ saith of the Holy Ghost, "he shall receive of mine, and shall shew it unto you," he could not, for the reason already assigned, mean by the Holy Ghost the Father or the power of the Father; and surely his meaning was not, that the apostles, under the influence of the power of the Father, should receive something and shew it each to himself! The Holy Ghost therefore is unquestionably a person; for tho' there are many passages of scripture in which the *gifts* of the Holy Ghost are called the *Holy Ghost*, they are so called by a very common figure of speech, in which the effect receives the name of its cause: and since this person is joined with the Father and the Son in the formula of Christian baptism; since they who lied to the Holy Ghost are said † to have lied unto God; since blasphemy against him is a more heinous offence than the same sin against even the Father or the Son ‡; and since it was by the operation of the Holy Ghost that Jesus Christ was conceived of the Virgin Mary, and even on that account † called the Son of God—it follows undeniably, that the Holy Ghost is God, of the same substance with the Father and Son.

† Acts v.
4.

‡ Mark iii.
28, 29.

† Luke i.
35.

202
The apostles miraculously instructed in the principles of religion.

It was this divine Spirit which, on the day of Pentecost, inspired the apostles with the knowledge of different languages; and as these were given only to enable them to preach the gospel to every creature, it can admit of no

doubt but that he, who so amply provided the means of preaching, would take care that the gospel should be preached in purity. Our Saviour had told his apostles that the Comforter would guide them into all the truth (ἐν παντί αὐτοὺς ἀληθεύειν), and bring all things to their remembrance, whatsoever he had said unto them; but if they had not comprehended the meaning of what he said, the bare remembrance of his sayings would have been of little importance. That before this miraculous shedding abroad of the Spirit they had but a very imperfect knowledge of his doctrines, and of the purpose for which he had come into the world, is apparent from that unseasonable question which they put to him when assembled to witness his glorious ascension; "Lord, wilt thou at this time restore again the kingdom to Israel?"

Their minds still cherished with fondness the vain prospect of temporal power; but after the day of Pentecost they were directed to nobler objects. From the same Spirit they received diversities of gifts besides that of language; for we are assured by St Paul *, when speaking of the early converts to Christianity in general, that "to one was given by the Spirit the word of wisdom; to another the word of knowledge by the same Spirit; to another FAITH by the same Spirit; to another the gifts of HEALING by the same Spirit; to another the working of MIRACLES; to another PROPHECY; to another DISCERNING OF SPIRITS; to another DIVERS KINDS OF TONGUES; to another the INTERPRETATION of tongues:" and these gifts, which were severally divided either among private Christians or among the inferior orders of ministers in the church, we have reason to believe were all bestowed in a greater or less degree upon each of the apostles.

Men thus endowed were well qualified to declare unto the world all the council of God. By the word of *wisdom* they communicated to the Gentile nations a pure system of what is called *natural religion*; turning them from the vanity of idols to the worship of the living God: by the word of *knowledge*, they preached the great doctrines of revelation both to Jews and Gentiles, shewing them that there is none other name under heaven given unto men whereby they may be saved than the name of Jesus Christ (L); and by their gifts of *healing* and of *miracles*, &c. they were enabled to prove unanswerably that their doctrines were divine. They taught everywhere the unity of God, the creation of the world, the fall of man, the necessity of redemption, the divinity of the Redeemer, his sacrifice on the cross to restore mankind to their forfeited immortality, and the terms of the new covenant into which they had through him been graciously admitted by God.

Such a view as our limits would admit of we have given of all these doctrines, except that which respects the terms of the gospel covenant; but these being explicitly stated only by St Paul and St James, we could not till now investigate them, without violating the historical order into which, for the sake of perspicuity, we have digested the several parts of this short system. Our Saviour himself has indeed taught with great plainness the necessity of faith and baptism

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Their great need of such instruction.
* 1 Cor. xii. 8—12.

(L) It is not perhaps easy to determine what is here meant by the word of *WISDOM* and the word of *KNOWLEDGE*, as distinguished from each other. By the former (λογος σοφίας), bishop Warburton understands all the great principles of natural religion. "The ancients (says he) used the word σοφία in this peculiar sense; it is used in the same sense by St Paul in Col. iv. 5.; and we can hardly give it any other in the place before us, where we see the word of wisdom distinguished from the word of knowledge (λογος γνωσεως), which evidently means all the great principles of revelation; the term γνωσις being as peculiarly applied by Christian writers to revealed religion as σοφία is by the Gentiles to the natural. St Paul uses the word in this sense in 2 Cor. xi. 6. where he says, Εἰ δὲ καὶ ἰδιώτης τῶν λόγων ἀλλ' οὐ τῇ γνώσει; and St Peter in his first epistle, chap. iii. verse 7. Hence those early heretics, who so much deformed the simplicity and purity of the Christian faith by visionary pretences to superior knowledge of revelation, took from this word the name of *Gnostics*." See Warburton's *Sermon on the Office and Operation of the Holy Ghost*.

Theology, more peculiarly Christian. baptism to the salvation of those who have an opportunity of hearing the gospel preached with power (see BAPTISM); and in his sermon on the mount, which is such a lecture of ethics founded on religion as the Son of God only could have delivered, we learn, that "unless our righteousness shall exceed the righteousness of the Scribes and Pharisees, we shall in no case enter into the kingdom of heaven; that not every one who saith unto Christ, Lord, Lord, shall enter into the kingdom of heaven, but he who doth the will of his Father who is in heaven; and that many will say to him at the day of judgment, Lord, Lord, have we not prophesied in thy name? and in thy name done many wonderful works?" which could not be done without faith; "to whom he will, notwithstanding, say, Depart from me, ye that work iniquity &c." St Paul, however, seems to attribute our justification to the bare act of believing; for he repeatedly assures us, "that a man is justified by faith without the deeds of the law;" while St James, on the other hand, affirms, "that by works a man is justified, and not by faith only."

† St
Matth. v.
20. vii. 21.
—24.

This apparent difference in the language of the two apostles, for we hope to show that it is only apparent, has produced among divines opinions really different respecting the justification of Christians; and the principal of these opinions it is our duty to state. But previous to this, it will be necessary to ascertain the meaning of the word *justification*; for we are sorry to say, that for want of accurate definitions, many theological controversies are nothing better than empty logomachies; and perhaps against no controversy can this charge be brought with greater truth than against that which, in the end of the last century and in the beginning of the present, was so violently agitated concerning the *causes*, the *instruments*, and the *conditions*, of justification.

204
Meaning
of justifica-
tion.

Between *pardon* of sin and *justification* there is so close a connection, that many writers seem to consider the terms as synonymous, and to infer, that he who is pardoned is *ipso facto* justified. That every Christian, who shall be pardoned at the judgment of the great day, will likewise be justified, is indeed true; but in propriety of speech, *justification* is a word of very different import from *pardon*, and will entitle the Christian to what mere pardon could not lead him to expect. An innocent person, when falsely accused and acquitted, is *justified* but not *pardoned*; and a criminal may be *pardoned*, though he cannot be *justified* or declared innocent. A man whose sins are pardoned is free from punishment; but the justified Christian is entitled to everlasting life, happiness, and glory. If we were only pardoned through Christ, we should indeed escape the pains of hell, but could have no claim to the enjoyments of heaven; for these, being more than the most perfect human virtue can merit, must be, what in the Scriptures they are always said to be, "the gift of God through Jesus Christ our Lord." Hence it is that St Paul, distinguishing, as we have done upon his authority, between mere remission of sins and justification of life, declares †, that "Jesus our Lord was *delivered* for our offences, and *raised* again for our *justification*."

† Romans
iv. 25.

The word justification, as used both by St Paul and St James, has been very generally considered as a forensic term expressing the sentence of a judge. The most eminent reformed divines of all denominations*, and even many of the Romanists themselves, have strenuously contended, that this is its genuine sense, when it is distinguished from mere remission of sins, regeneration, and sanctification; and if so, it will signify God's pronouncing a person *just*, either as being perfectly blameless, or as having fulfilled certain conditions required of him in the Christian covenant. But that "there is not a just man upon earth, who doth good and

* Lim-
borch, Bull,
Waterland,
Warburton,
Beveridge,
Pitringa,
Gill, &c.

finneth not," is made known to us by the most complete evidence possible, the joint dictates of our own consciences and of divine revelation; and therefore whosoever is pronounced just by the Judge of all the earth, must be so, either because, though not absolutely blameless, he has performed the conditions required of him in the covenant of grace, or because Christ has fulfilled all righteousness in his stead.

Theology,
more pecu-
liarly Chri-
stian.

If this be the Scripture notion of justification, it must be wholly the act of God, and cannot be the effect either of our faith or of our virtue. Accordingly, we are said by the apostle to be justified freely by his grace through the redemption that is in Jesus Christ; whom *God hath set forth* to be a propitiation through faith in his blood †. The act of justification therefore proceeds from the divine philanthropy, and cannot be performed by the instrumentality of faith; for it is not God, but man, who believes; and man is not the justifier of himself. To talk of any kind of *instrument* of justification besides the propitiation set forth by God, is indeed to make use of very improper language: "Omnis causa instrumentalis (says Bishop Bull †), suo modo in effectum influit, eique effecti productio propriè attribui potest. Jam vero, cum justificatio nihil aliud sit quam gratus Dei actus, quo peccata nostra nobis condonet, ac nos ad salutem acceptet, valde absurdum esset dicere, vel fidem, vel opera nostra, vel quidvis aliud nostri aut remittere peccata nostra, aut personas nostras acceptare: quod tamen, si instrumentalis causa justificationis fides sit, planè dicendum esset."

205
It is a fo-
rensic
term.

† Rom. iii.
24, 25.

† Harmonia
Apostolica,
cap. ii. § 9.

In this sentiment of the illustrious Bishop of St David's, some of the most eminent divines both among the Calvinists and Arminians agree; and indeed it is not easy to be conceived how any man can entertain a different sentiment, when considering justification in its proper sense. Many, however, have chosen to treat of justification not only in the active sense, as it is the act of God, for all admit that it is he who justifies; but likewise in a passive sense, as it means our *privilege* or *possession* holden of him, when we are said to be justified by his grace. In this view of the subject they may talk, with sufficient propriety, of an instrument of justification, not as the mean by which it is conveyed, but as the medium through which it is received by the true Christian. And hence it follows, that the Doctors Waterland and Warburton, of whom the former was not a thorough Calvinist, and the latter was a professed Arminian, strenuously maintain the doctrine of the Westminster Confession, that "faith receiving and resting on Christ is the alone instrument of justification; though it cannot be alone in the person justified, but must ever be accompanied with all other saving graces, and be a faith which worketh by love."

But notwithstanding this agreement between the leaders of the rival sects, they have found abundant matter of controversy respecting faith and works, in deciding the great question, "Whether, when God justifies man, he considers him as absolutely righteous on account of Christ's righteousness performed in his stead; or only as just, because he has fulfilled the conditions of the covenant of grace, which does not require of him perfect righteousness?" The former is the doctrine of the more rigid Calvinists, the latter that of the Arminians or Remonstrants.

"A notion (says Dr Gill †) obtained some years ago, that a relaxation of the law and the severities of it has been obtained by Christ; and a new law, a remedial law, a law of milder terms, been introduced by him, which is the gospel; the terms of which are, faith, repentance, and new obedience; and though these be imperfect, yet, being sincere, they are accepted by God in the room of a perfect righteousness. But every article of this scheme (continues he) is wrong; for

† Body of
Divinity,
vol. ii.
book iii.
chap. 8.
§ 5.

Theology, for the law is not relaxed, nor any of its severities abated; more peculiarly Christian. Christ came not to destroy, but to fulfil it; and therefore it requires the same holy, just, and good things, as ever. Nor is the gospel a new law. There is nothing in it (he says) which looks like a law; for it has no commands in it, but all promises, being a pure declaration of grace and salvation by Christ; nor are faith, repentance, and new obedience, required by it as conditions of man's acceptance with God. Faith and repentance are gospel doctrines, and parts of the gospel ministry; they are graces, and not terms required to be performed by men of themselves. Faith is the gift of God, and repentance is a grant from him. It is not true (continues our author) that God will accept of an imperfect righteousness in the room of a perfect one; nor can any thing more highly reflect upon the justice and truth of God, who is the judge of all the earth, than to suppose that he can ever account that as a righteousness which is not one."

† See his *Private Thoughts of Religion.*

* Rom. viii. 4.

* Rom. iv. 6.

Having thus proved by arguments which were almost in the same words stated long before by Bishop Beveridge †, that the gospel is no relaxation of the law, he proceeds to lay down his own notions of justification, of which (he says) "the sole matter, or that for the sake of which a sinner is justified before God, is the righteousness of Christ—that which he did and suffered on earth, in our nature, in our stead, and as our representative. This is commonly called his active and passive obedience; and when the purity and holiness of his own nature was added to it, the whole made up the δικαίωμα του νομου, the righteousness of the law, which was fulfilled by him as the head and representative of his people *; for whatever the law required is necessary to a sinner's justification before God, and it required of sinners more than it did of man in innocence. Man was created with a pure and holy nature, conformable to the pure and holy law of God; and it was incumbent on him to continue so, and to yield in it perfect and sinless obedience; in the failure whereof he was threatened with death. Man did fail; by which his nature was vitiated and corrupted, and his obedience became faulty and imperfect. He therefore became liable to the penalty of the law, and still perfect obedience was required of him. To the justification of a sinner therefore is required the most complete obedience, active and passive; or, in other words, purity of nature, perfect obedience, and the sufferings of death; all which meet in Christ, the representative of his people, in whom they are justified. There are indeed some divines (continues our author) who exclude the active obedience of Christ from being any part of the righteousness by which men are justified. They allow it to have been a condition requisite in him as a Mediator, qualifying him for his office; but deny that it is the matter of justification, or reckoned for righteousness to man. But without the active obedience of Christ the law would not be satisfied; the language of which is, *Do and live*; and unless its precepts be obeyed, as well as its penalty endured, it cannot be satisfied; and unless it be satisfied, there can be no justification. If therefore men are justified by the righteousness of Christ, it must be by his active obedience imputed and made over to them, so as to become their's, even as David describeth the blessedness of the man unto whom God imputeth righteousness without works *. That this is really the way in which men are justified, our author thinks evident, because they must be justified either by an inherent or by an imputed righteousness; but they cannot be justified by their own inherent righteousness, for that is imperfect, and therefore not justifying. Hence the apostle 'counts all things but dung, that he may win Christ and be found in him; not having his own righteousness, which is of the law, but that which is through the faith of

Christ, the righteousness which is of God by Faith §.' But Theology, by such a righteousness as this a man cannot be justified in more peculiarly Christian. any other way than by an imputation of it to him. Whence it follows, that 'as by one man's disobedience many were made sinners by imputation, so by the obedience of one shall many be made righteous, by having that obedience placed to their account.' Phil. iii. 8, 9.

As this author properly considers justification as the act of God, he does not approve of the language in which faith is called the instrument either of conferring or receiving it. "Faith (says he *) is merely the evidence of justification to the person justified; for 'faith is the evidence of things not seen.' The righteousness of God, of the God-man and Mediator Jesus Christ, is revealed from faith to faith in the everlasting gospel ‡; and therefore must be before it is revealed, and before the faith to which it is revealed. Faith is that grace whereby a soul, having seen its guilt and its want of righteousness, beholds in the light of the Divine Spirit a complete righteousness in Christ, renounces its own, lays hold on that, puts it on as a garment, rejoices in it, and glories of it; the Spirit of God witnessing to his spirit that he is a justified person: and so he is evidently and declaratively 'justified in the name of the Lord Jesus, and by the Spirit of our God †'. Faith adds nothing to the *esse*, only to the *bene esse* of justification; which is a complete act in the eternal mind of God, without the being or consideration of faith, or any foresight of it. In the account of God, a man is as much justified before his faith as after it; and after he does believe, his justification depends not on his acts of faith, for though *we believe not, yet God abides faithful* to his covenant-engagements with his Son, by whose suretyship-righteousness the elect are justified; but by faith men have a comfortable sense, perception, and apprehension, of their justification, and enjoy that peace of soul which results from it. It is by that only, under the testimony of the Divine Spirit, that they know their interest in it, and can claim it, and so have the comfort of it."

Though this language differs from that of the Westminster Confession, the author seems not to teach a different doctrine; for if faith be that grace by which a soul renounces its own righteousness, and lays hold of Christ's, which it puts on as a garment, it must be that very thing which the compilers of the Confession meant by their definition of faith receiving and resting on Christ and his righteousness, when they called it "the alone instrument of justification." Accordingly our author elsewhere * teaches, that "true faith in sensible sinners assents to Christ and embraces him, not merely as a Saviour of man in general, but as a special suitable Saviour for them in particular. It proceeds upon Christ's being revealed in them as well as to them, by the spirit of wisdom and revelation, in the knowledge of him as a Saviour that becomes them. It comes not merely through external teachings by the hearing of the word from men; for no man, saith our blessed Lord, can come to me except the Father draw him; but such souls as are thus drawn, having heard and learned of the Father, believe not only in the doctrine of Christ, but also in himself, trusting in him alone for everlasting life and salvation."

Were it not that this author, in every thing that he writes, has an eye to the doctrine of election and reprobation, which he screws up to a greater height than almost any other divine with whose works we are acquainted, he would differ little in his notions of justification from the more moderate Arminians. "Justification (says Limborch) is the merciful and gracious act of God, whereby he fully absolves from all guilt the truly penitent and believing soul, through and for the sake of Christ apprehended by a true faith: or gratuitously remits sins upon the account of faith in

207 And of the more moderate Arminians.

Theology, in Jesus Christ, and graciously imputes that faith for righteousness." Here indeed the imputation of Christ's righteousness is expressly denied; but our countryman Dr Waterland, who can hardly be considered as a Calvinist, seems to contend for the imputation of that righteousness to the sinner, as well as for faith being the instrument by which it is received.

* Summary View of Justification. "It cannot be for nothing (says that able writer *) that St Paul so often and so emphatically speaks of man's being justified by faith, or through faith in Christ's blood; and that he particularly notes it of Abraham, that he *believed*, and that his faith was counted to him for justification, when he might as easily have said that Abraham, to whom the gospel was preached, was justified by gospel-faith and obedience, had he thought faith and obedience equally instruments of justification. Besides, it is on all hands allowed, that though St Paul did not directly oppose faith to *evangelical works*, yet he comprehended the works of the *moral law* under those which he excluded from the office of *justifying*, in his sense of the word justification. He even used such arguments as extended to all kinds of works; for Abraham's works were excluded, tho' they were undoubtedly evangelical. To prove that he interprets the apostle's doctrine fairly, our author quotes, from the genuine epistle of Clemens of Rome, a passage, in which it appears beyond a doubt that this fellow-labourer of St Paul so understood the doctrine of justifying faith as to oppose it even to evangelical works, however exalted. It is true (continues our author), Clemens elsewhere, and St Paul almost everywhere, insists upon true holiness of heart and obedience of life as indispensable conditions of salvation or justification; and of that, one would think, there could be no question among men of any judgment or probity. But the question about conditions is very distinct from the other question about instruments; and therefore both parts may be true, viz. that faith and obedience are equally conditions, and equally indispensable where opportunities permit; and yet faith over and above is emphatically the instrument both of receiving and holding justification, or a title to salvation.

"To explain this matter more distinctly, let it be remembered, that God may be considered either as a party contracting with man on very gracious terms, or as a Judge to pronounce sentence on him. Man can enter into the covenant, supposing him adult, only by assenting to it, and accepting it, to have and to hold it on such kind of tenure as God proposes: that is to say, upon a self-denying tenure, considering himself as a guilty man standing in need of pardon, and of borrowed merits, and at length resting upon mercy. So here, the previous question is, Whether a person shall consent to hold a privilege upon this submissive kind of tenure or not? Such assent or consent, if he comes into it, is the very thing which St Paul and St Clemens call *faith*. And this previous and general question is the question which both of them determine against any proud claimants who would hold by a more self-admiring tenure.

"Or if we next consider God as sitting in judgment, and man before the tribunal going to plead his cause; here the question is, What kind of plea shall a man resolve to trust his salvation upon? Shall he stand upon his innocence, and rest upon strict law? or shall he plead guilty, and rest in an act of grace? If he chooses the former, he is proud, and sure to be cast: if he chooses the latter, he is safe so far in throwing himself upon an act of grace. Now this question, also, which St Paul has decided, is previous to the question, What conditions even the act of grace itself finally insists upon? A question which St James in particular, and the general tenor of the whole Scripture, has abundantly satisfied; and which could never have been made a question by

any considerate or impartial Christian. None of our works are good enough to stand by themselves before him who is of purer eyes than to behold iniquity. Christ only is pure enough for it at first hand, and they that are Christ's at second hand in and through him. Now because it is by faith that we thus interpose, as it were, Christ between God and us, in order to gain acceptance by him; therefore faith is emphatically the instrument whereby we receive the grant of justification. Obedience is equally a condition or qualification, but not an instrument, not being that act of the mind whereby we look up to God and Christ, and whereby we embrace the promises."

But though our author contends that faith is the instrument of justification, he does not, like the Antinomians, teach that it will save men without works. "The covenant of grace (says he) has conditions annexed to it of great importance, for without them no instruments can avail. These are faith and obedience, as St James hath particularly maintained. St Paul had before determined the general and previous question respecting the plea by which we ought to abide; and when some libertines, as is probable, had perverted his doctrine of faith and grace, St James showed that the very faith which rests in a covenant of grace implies a cordial submission to the conditions of that covenant, otherwise it would be nothing but an empty ceremony. The perfect agreement between St Paul and St James in the article of *justification*, appears very clear and certain. St Paul declares, that in order to come at justification, it is necessary to stand upon grace, not upon merit; which St James does not deny, but rather confirms, in what he says of the perfect law of liberty (James i. 25. ii. 12). St Paul makes faith the instrument of receiving that grace; which St James does not dispute, but approves by what he says of Abraham (ii. 23.); only he maintains also, that, in the conditionate sense, justification depends equally upon faith and good works; which St Paul also teaches and inculcates in effect, or, in other words, through all his writings. If St Paul had had precisely the same question before him which St James happened to have, he would have decided just as St James did; and if St James had had precisely the same question before him which St Paul had, he would have determined just as St Paul did. Their principles were exactly the same, but the questions were diverse; and they had different adversaries to deal with, and opposite extremes to encounter, which is a common case.

"It may be noted, that that faith which is here called a *condition*, is of much wider compass than that particular kind of faith which is precisely the instrument of justification. For faith as a condition means the whole complex of Christian belief, as expressed in the creeds; while faith as an instrument means only the laying hold on grace, and resting in Christ's merits in opposition to our own deservings: though this also, if it is a vital and operative principle (and if it is not, it is nothing worth), must of course draw after it an hearty submission to, and observance of, all the necessary conditions of that covenant of grace wherein we repose our whole trust and confidence. So that St Paul might well say, "Do we then make void the law (the moral law) through faith? God forbid: Yea, we establish the law *." * Rom. iii. We exempt no man from religious duties; which are duties still, though they do not merit nor are practicable to such a degree as to be above the need of pardon: they are necessary conditions in their measure of justification, though not sufficient in themselves to justify, nor perfect enough to stand before God or to abide trial: therefore Christ's merits must be taken in to supply their defects: and so our resting in Christ's atonement by an humble self-denying faith is our last resort, our anchor of salvation both sure and steadfast,

Theology, more peculiarly Christian.

209 Faith and obedience its conditions.

208 Faith the instrument of it.

Theology, fast, after we have otherwise done our utmost towards the more pecu-
liarly Chri-
stian. fulfilling of God's sacred laws, towards the performing of
all the conditions required.

"That good works, internal and external, are according as opportunities offer and circumstances permit, *conditions* properly so called, is clear from the whole tenor of Scripture, as hath been often and abundantly proved by our own divines (M), and is admitted by the most judicious among the foreign Reformed (N). Yet some have been very scrupulous as to this innocent name, even while they allow the absolute necessity of good works as indispensable qualifications for future blessedness. Why not conditions therefore as well as qualifications? Perhaps because that name might appear to strike at absolute predestination, or unconditional election; and there may lie the scruple: otherwise the difference appears to lie rather in words than in things.

"Some will have them called not conditions, but *fruits* or *consequents* of justification. If they mean by justification the same as the grace of the Holy Spirit, and the first grace of faith springing from it, they say true; and then there is nothing more in it than an improper use of the word *justification*, except that from abuse of words very frequently arises some corruption of doctrine. If they mean only, that outward acts of righteousness are fruits of inward habits or dispositions; that also is undoubtedly true: but that is no reason why internal acts, virtues, graces (good works of the mind), should not be called conditions of justification; or why the outward acts should not be justly thought conditions of preserving it. But if they mean that justification is ordinarily given to adults, without any preparative or previous conditions of faith and repentance, that indeed is very new doctrine and dangerous, and opens a wide door to carnal security and to all ungodliness."

210
Objections
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more zealous Ar-
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doctrine.

Such is the doctrine of Christian justification as it has been taught by the followers of Calvin, and by some of the most eminent Arminians who flourished in the end of the last and beginning of the present century. They appear not, from this view of their opinions, to differ so widely as some of them have wished the world to believe. It is evident that Dr Waterland, though he rejects some of the distinguishing tenets of Calvinism, lays greater stress upon faith in his scheme of justification than Dr Gill himself; and that they both consider it as the *instrument* by which the adult Christian must receive the imputed righteousness of Christ. The greater part of modern Arminians, however, exclaim against the imputation of Christ's righteousness, as a doctrine false in itself, and fraught with the most pernicious consequences; and they would be ready to tell Dr Gill, in his own words, that of his scheme every article is wrong. It is not true (say they) that God exacts of man, or ever did exact of him, an obedience absolutely perfect; for under every dispensation man was in a state of discipline, and had habits of virtue and piety to acquire; and it is probable that his progress in piety, virtue, and wisdom, will continue for ever, as none but God is perfect and stationary, and incapable of deviating from the line of rectitude. Most of them, after Bishop Bull, dislike the use of such unscriptural phrases as *the instrument of justification*, applied either to faith or to works; and think, that by considering God as the sole justifier of man, upon certain conditions, they can more precisely ascertain the distinct provinces of faith and obedience in the scheme of justification, than either their brethren of the old school of Arminius, or their rivals of the school of Calvin.

By the very constitution of man, piety and virtue are duties which, if he do not sincerely perform, he must of course forfeit the favour of his Maker; but the most perfect performance of his natural duties would not entitle him to a supernatural and eternal reward. Eternal life is the *gift* of God through Jesus Christ; and it is surely reasonable that we should acknowledge it to be so, and not claim it as a debt due to our merits. The pious and virtuous man has a natural claim to more happiness than misery during the period of his existence, a claim founded on the attributes of that God who called him into being; but he has no natural claim to a future life, and still less to a perpetuity of existence. This is a truth not more clearly taught in the holy scripture than consonant to the soundest philosophy: and yet, by not attending to it, have St Paul and St James been set at variance, and the most opposite doctrines taught respecting the justification of Christians.

Because faith in Christ cannot entitle a wicked man to eternal *happiness*, one class of divines seem to infer that such faith is not necessary to Christian *justification*, and that "his faith cannot be wrong whose life is in the right." They proceed upon the supposition that man is naturally immortal; that piety and virtue are entitled to reward; and that therefore the pious and virtuous man whatever be his belief, must undoubtedly inherit an eternal reward. But this is very fallacious reasoning. That piety and virtue are through the divine justice and benevolence entitled to reward, is indeed a truth incontrovertible; but that man who is of yesterday is naturally immortal; that a being who began to exist by the mere good will of his Maker, has in himself a principle of perpetual existence independent of that will—is a direct contradiction. Whatever began to be, can be continued in being only by the power, and according to the pleasure, of the infinite Creator; but it pleased the Creator of his free grace at first to promise mankind eternal life, on the single condition of their first father's observing one positive precept. That precept was violated, and the free gift lost: but the covenant was renewed in Christ, who "by his death hath abolished death, and by his resurrection hath brought to light life and immortality." The condition annexed to the gift thus restored was faith; for "being justified by faith §, we have peace with God through our Lord Jesus Christ; by whom also we have access by faith into this grace wherein we stand, and rejoice in the hope of the *GLORY OF GOD*." Faith therefore in the Son of God and Saviour of the world, is not only a condition, but the *sole* condition, of that justification which is peculiarly Christian; for since Christ, without any co-operation of ours, hath purchased for us the free gift of eternal life, we shall be guilty of the grossest ingratitude to our Divine Benefactor, and impiously claim an independence on God, if we look upon that gift either as a right inherent in our nature, or as a debt due to our meritorious deeds.

But though faith be the condition of Christian justification, as that implies the inheritance of *eternal life*, there are other conditions to be performed before a man can be put in possession of *eternal felicity*. By a law long prior to the promulgation of the gospel—a law interwoven with our very being—no man can enjoy the favour of his Maker, who does not make it his constant endeavour "to do justly, to love mercy, and to walk humbly with his God." This law was in force before man fell; it continues to be in force now that he is redeemed; and it will not be abrogated even at that

(M) Bull. *Op. Latin.* p. 412, 414, 415, 430, 434, 514, 516, 544, 583, 645, 668. *Edit. ult.*—Stillingfleet's Works, vol. III. p. 367, 380, 393, 398.—Tillotson's Posthumous Sermons, vol. II. p. 484, 487.

(N) Vossius *de Bonis Operibus*, Theol. x. p. 370.—Op. tom. VI. *Frid. Spanhem. fil.* Op. tom. III. p. 141, 159.

²¹⁴ Theology, that period when faith shall give place to vision, and hope more pecu-
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stian.
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eternal life

to enjoyment. By the grace of the Christian covenant, all mankind are rendered immortal in consequence of the death and resurrection of Christ, who is the Lamb slain, in the divine decree, from the foundation of the world; but to obtain immortal *happiness*, they must observe the conditions both of natural and of revealed religion, which are repentance from dead works, and faith in Christ the Redeemer. The former is that condition upon which alone we can retain the Divine favour, and of course enjoy either present or future happiness; the latter is a most equitable acknowledgment required of us, that perpetual conscious existence is neither a right inherent in our nature, nor a debt due to our virtuous obedience, but merely the gift of God through Jesus Christ our Lord.

²¹⁵ Div. Log.
book ix.
chap. 3.
Illustrated
by a fami-
liar exam-
ple.

"To make the distinct provinces of faith and works in the business of justification clear, let us suppose (says bishop Warburton †), that, at the publication of the gospel, all to whom the glad tidings of immortality were offered on the condition of *faith in Jesus* had been moral or virtuous men, and on that account entitled (as natural religion teacheth) to the favour of God and an abundant reward; is it not self-evident, that FAITH ALONE, exclusive of the condition of good works, would, in that case, have been the very thing which *justified* or entitled them to life *everlasting*? But are *good works*, therefore, of no use in the Christian system? So far from it, that those only who serve God in sincerity and in truth are capable of the justification which faith alone embraces; for, to illustrate this matter by a familiar instance, suppose a British monarch to bestow, in *free gift*, a certain portion of his own *domains*, to which immortality may well be compared, upon such of his subjects as should perform a certain service to which they were not obliged by the laws of the kingdom; it is evident that the performance of this last service ONLY would be the thing which entitled them to the *free gift*. Yet it is obvious that obedience to the laws, which gave them a claim to protection as subjects, in the enjoyment OF THEIR OWN PROPERTY (to which the reward offered by natural religion may be compared), would be a previous and necessary qualification to their enjoyment of their new possession; since it is absurd to suppose that such a *gift* could be intended for rebels and traitors, or indeed for any but good and faithful servants of their king and country." Well therefore might the apostle reprove the ignorance or licentiousness of certain of his converts at Rome, in his question—"Do we then make void the LAW through FAITH? God forbid! yea, we ESTABLISH THE LAW;" obedience to it being the previous qualification of all who are entitled to the fruits of justifying faith—LIFE AND IMMORTALITY.

²¹⁶ Sum of
Christiani-
ty.

Had proper attention been paid to this distinction, which St Paul everywhere makes between such duties as are common to all religions that are true, and those which are peculiar to the Christian revelation, many useless controversies might have been avoided respecting the instrument of justification and the conditions of the Christian covenant. By not attending to it, the divines of one school, who perceive that the mere belief of any truth whatever cannot entitle a man to eternal felicity, have almost dropt faith from their system of Christianity, and taught moral duties like Pagan philosophers; whilst another party, who err almost as far in their interpretations of scripture, finding eternal life represented as the *gift of God*, and faith in Christ as the instrument or means by which that gift must be accepted, have expunged from their system the necessity of good works, forgetting surely that wicked believers, like believing devils, may be doomed to an eternity of torments. But the sum of Christianity, as we are taught by the beloved disciple, is

Theology, more pecu-
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comprehended in this one commandment of God, "that we should believe on the name of his Son Jesus Christ, and love one another as he gave us commandment." In perfect harmony with him, the great apostle of the Gentiles, from whose mistaken words much empty noise has been raised about this question, assures us §, that "in Christ Jesus no thing can avail to our eternal happiness but faith which WORKETH BY LOVE;" and he informs Titus ||, that it "is a true saying, and what he wills to be constantly affirmed, that they who have believed in God be careful to maintain good works."

Indeed no man can have complete faith in Christ, who believes not the promises of the gospel; but all those promises, except the single one of a resurrection from the dead to perpetual conscious existence, are made to us upon the express condition that we obey the law of the gospel; "for God will render to every man according to his deeds: to them that are contentious and do not obey the truth, but obey unrighteousness, indignation and wrath; tribulation and anguish upon every soul of man that doth evil, of the Jew first and also of the Gentile; but glory, honour, and peace to every man that worketh good, to the Jew first and also to the Gentile *."

²¹⁷ The Chri-
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paradisaical.

Such are the notions of justification entertained by those who in the present age have been considered as the leaders of the sect of Arminians. How far they are just, the reader must decide for himself, as our business is little more than to collect into one point of view the scattered opinions of others; but under every view of this doctrine which we have taken, the Christian covenant appears much more gracious than that into which Adam was admitted in paradise; since it affords room for repentance, even to that man, who may be so unhappy as to be withdrawn for a time into apostacy from the terms of the covenant. Whether the death of Christ therefore was a *direct* atonement for the actual sins of men, or only operated as such *indirectly* by procuring for them repeated opportunities of repentance, it is an undoubted truth, that "if through the offence of one many be dead, much more the grace of God, and the gift by grace, which is by one man, Jesus Christ, hath abounded unto many. And not as it was by one that sinned, so is the gift: for the judgment was of one offence to *condemnation*, but the free gift is of many offence to *justification* ||."

²¹⁸ Christians
sanctified
by the Holy
Ghost, who

Thus graciously has the divine goodness displayed itself in the restoration of our lost inheritance. But it stopt not here. The same bountiful Lord of life, for its further security, imparts to every true believer the strength and light of his holy spirit to support faith in working out our own salvation. Our blessed Saviour, "who gave himself for us, that he might redeem us not only from death, but likewise from all iniquity, and purify to himself a peculiar people zealous of good works §," promised, before he left this world, to send to his followers the Holy Ghost or Comforter to abide with them for ever, to guide them into all truth, to bring all things to their remembrance whatsoever he had said unto them, and, as we learn from other passages of scripture, to "work in them both to will and to do of his good pleasure." How amply this promise was fulfilled to the apostles, we have already seen; but we are not to suppose that it was restricted to them. As man is designed for a supernatural state in heaven, he stands in need of supernatural direction to guide him to that state. "No man (says our Saviour) can come to me except the Father draw him; for as no man knoweth the things of a man save the spirit of a man which is in him, even so none knoweth the things of God but the Spirit of God." This omniscient Spirit indeed "searcheth all things, yea even the deep things of God," and revealeth them to the sons of men, to enlighten their

Theology, their understandings and purify their hearts. The grace which he sheds abroad is either external and general, or internal and particular. The former has been extended to the whole church of God under the patriarchal, Mosaic, and Christian dispensations, in such a revelation of the divine will as was sufficient to instruct men unto eternal life, whether they had a clear view or not of that stupendous plan of redemption, by which the kingdom of heaven was opened to them after the forfeiture of the terrestrial paradise; for there have been "holy prophets ever since the world began; and prophecy came not at any time by the will of man, but holy men of God spake as they were moved by the Holy Ghost *." Hence it is that all scripture was given by inspiration of God to teach us every thing which it is necessary for us to know and believe; and the scripture is that work of the spirit which is extended to the universal church.

* Luke i.
70. and
2 Peter i.
21.

But the same spirit which thus generally reveals the object of faith to the church, does likewise particularly illuminate the minds of individual believers, working in them an assent to that which is taught them from the written word. It was thus that "the Lord opened the heart of Lydia †, that she attended to the things which were spoken of Paul;" it is thus that "the word preached doth not profit if it be not mixed with faith in them who hear it ‡;" and it is thus that "God deals to every man the measure of faith §;" for "by grace are we saved through faith, which is not of ourselves; it is the gift of God ¶." This illumination of the Spirit was conveyed to the apostles "in a sound from heaven as of a rushing mighty wind," because it was meant to testify to the world that they were chosen ministers of the gospel; but the ordinary Christian receives it "in the still small voice," because it is conveyed to him only to "open his understanding that he may understand the scriptures."

† Acts xvi.
14.

‡ Heb. iv.
2.

§ Rom. xii.
3.

¶ Eph. ii. 8.

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Regene-
rates them,

* Titus i.
5, 6.

Another operation of the Spirit on the minds of believers is that which in scripture is called REGENERATION; for "according to his mercy God saveth us by the washing of regeneration and renewing of the Holy Ghost *, which he sheds on us abundantly through Jesus Christ our Lord." To those who believe that we derive from Adam a corrupted nature, this particular grace must appear so absolutely necessary, that without it we could have no relish for heaven or heavenly things. "The natural man (we are told) receiveth not the things of the spirit of God; for they are foolishness to him; neither can he know them, because they are spiritually discerned." Indeed whatever be the powers of our moral faculties, when compared with those of our first father, it is so long before they be completely developed, that we should infallibly be lost, if we were not blessed by a supernatural guide, when reason is incapable of directing our conduct. Our passions and appetites are in their full strength before experience has furnished the mind with materials, by means of which motives may be weighed; and therefore it would be impossible, during the giddy period of youth, to keep them in due subjection, or to prevent vicious habits from being formed, were we not influenced by divine grace. So true is it, that "except a man be born again of water and of the Holy Ghost, he cannot enter into the kingdom of God." This change in our dispositions, from an immoderate attachment to earth to a relish for the things of heaven, is in scripture called "a renewing of our minds, a new creation, a new man;" in opposition to our natural disposition, which is called "the old man, corrupted according to the deceitful lusts." The ancient fathers of the church, as well as some very eminent modern divines †, generally speak of baptism as the instrument in God's hand of man's regeneration; and for the truth of their opinion they

† Clarke
and Water-
land.

appeal to John iii. 3, 5. Ephes. v. 25, 26. and 1 Cor. vi. 11. in which great stress is certainly laid upon the washing of water, as well as upon sanctification by the word.

A third office of the Holy Spirit is to lead, direct, and govern us through all the periods of our lives. Without such a leader and guide, the temptations with which we are surrounded would certainly overcome us, and we should faint long before we arrive at the end of our journey. By the very constitution of our nature we are subjected in some degree to the influence of sense, of which the objects are present, whilst the enjoyments of heaven are future, and seen, as at a distance, only by the eye of faith; but "the law of the Spirit of life, in Christ Jesus, hath made us free from the law of sin and death;" for God worketh in us both to will and to do of his good pleasure; and as many as are thus led by the spirit of God, they are the sons of God; and while they walk in the Spirit, they do not fulfil the lusts of the flesh." Without the aid of the same Spirit, we could not even make our prayers acceptable; for since "our confidence in God is, that he heareth us only when we ask any thing according to his will; and since we know not what we should pray for as we ought, the Spirit itself maketh the intercession for us with groanings which cannot be uttered *."

Theology,
more pecu-
liarly Chri-
stian.

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Guides
them
through
life,

A fourth operation of the Holy Ghost, as he is the sanctifier of Christians, is to join them to Christ, and make them members of that one body of which he is the head.

* Rom. viii.
26.

"For by one Spirit are we all baptized into one body †; and as the body is one and hath many members, and all the members of that one body being many are one body, so also is Christ." "Hereby we know that God abideth in us, by the Spirit which he hath given us;" and as, in the ordinary course of his dealings with Christians, this Spirit is first given in baptism, so is it continued to the faithful by the instrumentality of the Lord's supper. That ordinance we have elsewhere (see *SUPPER of the Lord*) proved to be a federal rite; and surely no time can be supposed so highly sanctified for the reception of the graces of the Holy Spirit, as that in which we renew our federal union with our Lord and Master in the communion of his body and blood.

† 1 Cor.
xii. 12, 13.
221
Unites
them to
Christ,

It is likewise the office of the Holy Ghost to give us an earnest of our everlasting inheritance, to create in us a sense of the paternal love of God, and thereby to assure us of the adoption of sons. "As many as are led by the Spirit of God, they are the sons of God; and because we are sons, God hath sent forth the spirit of his Son into our hearts. For we have not received the spirit of bondage again to fear; but we have received the Spirit of adoption, whereby we cry Abba Father; the Spirit itself bearing witness with our spirit, that we are the children of God ‡."

As the gifts of grace are generally annexed to means, to the proper use of the word and sacraments, it is a sixth office of the same Spirit to sanctify such persons as are regularly set apart for the work of the ministry, and ordained to offer up the public prayers of the people; to bless them in the name of God; to teach the doctrines of the gospel; to administer the sacraments instituted by Christ; and to perform all things necessary "for the perfecting of the saints, for the work of the ministry, for the edifying of the body of Christ *."

† Gal. iv. 6.
Rom. viii.
15, 16.

The same Spirit which illuminated the apostles, and endowed them with power from above to perform personally their apostolic functions, fitted them also for sending others, as they were sent by their Divine Master; and for establishing such a constitution of the church as was best adapted for preserving Christians in the unity of the Spirit and bond of peace. They committed a standing power to a successive ministry to be conveyed down to the end of the world; and those who are vested with that power are obliged to "take heed unto themselves, and

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And sancti-
fies the ad-
ministrations
of the minis-
ters of the gos-
pel.

* Eph. iv.
12.

Theology, to all the flock over which the HOLY GHOST hath made them overseers, to feed the church of God, and to contend earnestly for the faith which was once delivered unto the saints †." See EPISCOPACY, INDEPENDENTS, PRESBYTERIANS, POPE, and QUAKERS.

By these, and the like means, doth the Spirit of God sanctify the sons of men; and in consequence of this sanctification proceeding immediately from his office, he is called the HOLY Spirit and the COMFORTER. This is such a provision "for renewing us in the spirit of our minds, and enabling us to put on the new man, which, after God, is created in righteousness and true holiness," as, when made known by revelation appears to have been expedient, may be conceived to have been even necessary, and, though reason could hardly have hoped for it, is contradicted by none of our natural notions either of God or of man. Many, however, are the controversies to which it has given rise in the church of God; some contending that it is given only unto the elect, upon whom it operates with resistless efficacy; others affirming that it is offered to all, but in such a manner as that, by the abuse of their free will, it may be "resisted, grieved, and quenched;" and some few, still intoxicated with the pride of PELAGIUS, think it is not necessary, and of course is not bestowed.

The questions concerning *election*, the *efficacy of grace*, and the final *perseverance of the saints*, we have stated elsewhere, and given a summary view of the arguments by which the contending parties maintain their respective opinions (see PREDESTINATION); and the texts of Scripture which we have just quoted, under the different heads of sanctification, show sufficiently that the opinion of Pelagius is directly contrary to the doctrine of the apostles. It may not be improper to inquire whether it be as agreeable to reason and experience as its proud patrons seem to imagine.

If it be unreasonable to expect any assistance from the Spirit of God in carrying on the work of our own salvation, how came so many of the wisest and best of men in all ages to believe, that he who sincerely endeavours to discharge his duty is supported in that endeavour by assistance from heaven? That such was the popular belief of the early Greeks, is evident from the poems of Homer; in which we everywhere find some god calming the passions of the heroes, altering their determinations when improper, and inspiring them with wisdom. Nor was this the sentiment of the poets only. Socrates, it is well known, professed to believe that his own conduct was under the direction of a superior spirit, which he called a *dæmon*; and Plutarch, as we find him quoted by Wollaston, speaks of the gods assisting men, by "exciting the powers or faculties of the soul; by suggesting secret principles, imaginations, or thoughts; or, on the contrary, by diverting or stopping them." Of the same opinion must Cicero have been, when he said, "stabit illud quidem, quod locum hunc continet, de quo agimus, esse Deos, et eorum providentia mundum administrari, eodemque consulere rebus humanis, nec solum *universis*, verum etiam *singulis* *;" for it is not conceivable that a particular providence can be administered without the influence of the Deity on the minds of men. That the poets and philosophers of the heathen world derived these notions from primeval tradition, cannot, we think, be questioned; but if they were absurd in themselves, or apparently contradictory to the laws of nature, they would not surely have been so universally embraced; for it will hardly be denied, that Socrates and Cicero were men of as great natural sagacity as Pelagius or any of his followers. It is indeed so far from being incredible that the Father of spirits occasionally di-

rects the thoughts and actions of men, that we believe there are very few who have made observations upon themselves and their own affairs, who have not found, upon reflection, many instances in which their usual judgment and sense of things were *over-ruled*, they know not *how* or *why*; and that the actions which they performed in those circumstances have had consequences very remarkable in their general history. See PROVIDENCE, n° 18, 19.

This being the case, why should the pride of Christians make them hesitate to admit, upon the authority of divine revelation, what Socrates, and Plutarch, and Cicero, and all the virtuous and wise men of antiquity, admitted in effect, upon no better evidence than that of oral tradition, supported by their own meditations on their own thoughts, and the principles of their own conduct? Is it that they see not such beneficial effects of Christianity as to induce them to believe the professors of that religion to be indeed "chosen to salvation through the sanctification of the Spirit?" Let them study the practical precepts of the gospel, consider the consequences which they have had on the peace and happiness of society, and compare the general conduct of Christians with that of the Jews, Pagans, and Mahometans (see RELIGION), and they will doubtless find reason to alter their opinion; and let those who embrace the truth, remember, that as they are the temple of God, if the Spirit of God dwell in them, "it is their indispensable duty to cleanse themselves from all filthiness of the flesh and spirit; to follow peace with all men, and holiness, without which no man shall see the Lord; and to work out their own salvation with fear and trembling, since it is God who worketh in them both to will and to do of his good pleasure."

From this short view of the several dispensations of revealed religion, it is evident that the gospel is not only the best but the last gift of the kind which man has to expect from his Maker; that the scheme of revelation is completed; and that the pretences of Mahomet and of more modern enthusiasts to divine inspiration are not only false, but fraught with contradictions. All these men admit the divine origin of the Mosaic and Christian religions; but it appears from the scriptures, in which those religions are taught, that the system of revealed truths which constitute the Patriarchal, Mosaic, and Christian revelations, commenced with the fall of man, and that it must therefore necessarily end with his restoration to life and immortality by the sacrifice of Christ upon the cross. A new revelation therefore like that of Mahomet cannot be admitted without rejecting the whole Bible, though the impostor himself everywhere acknowledges the inspiration of Abraham, of Moses, and of Christ. Nor is greater regard due to the claims of Christian enthusiasts. Such of these men as pretend to have been in heaven †, and thence to have brought spiritual discoveries to the earth, have either forgotten or never understood, that in the scriptures of the Old and New Testaments the great scene of Providence appears to be closed in the full completion of its one regular, entire, and eternal purpose; that St Paul has pronounced † a curse upon any man or angel from heaven who shall preach another gospel than what has been already preached by the apostles and evangelists; that in their writings we are taught every thing which it is our duty to believe or to practise in order to our own salvation; and that we have the promise of our blessed Lord himself, that the Spirit of truth shall remain with us to guide us into all necessary truth, till that great day when he shall come again to judge the world in righteousness, and render to every man according to his works.

Theophrast. **THEOPHRASTA**, in botany; a genus of plants belonging to the class of *pentandria* and order of *monogynia*. The corolla is campanulated, with divisions and segments obtuse; the capsule unilocular, globular, very large, and many-seeded. There is only one species, the *americana*.

THEOPHRASTUS, the philosopher, was born about 371 years before Christ, and was successively the disciple of Plato and of Aristotle. He succeeded Aristotle in the Peripatetic school, and conducted the charge with such high reputation that he had about 2000 scholars. He is highly celebrated for his industry, learning, and eloquence; and for his generosity and public spirit. He is said to have twice freed his country from the oppression of tyrants. He contributed liberally towards defraying the expence attending the public meetings of philosophers; which were held, not for the sake of shew, but for learned and ingenious conversation. In the public schools he commonly appeared, as Aristotle had done, in an elegant dress, and was very attentive to the graces of elocution. He lived to the advanced age of 85: Some say of 107. Towards the close of his life, he grew exceedingly infirm, and was carried to the school on a couch. He expressed great regret on account of the shortness of life; and complained that nature had given long life to stags and crows, to whom it is of so little value, and had denied it to man, who, in a longer duration, might have been able to attain the summit of science; but now, as soon as he arrives within sight of it, is taken away. His last advice to his disciples was, that, since it is the lot of man to die as soon as he begins to live, they would take more pains to enjoy life as it passes, than to acquire posthumous fame. His funeral was attended by a large body of Athenians. He wrote many valuable works, of which all that remain are, several treatises on the Natural History of Plants and Fossils; Of Winds, Of Fire, &c. a rhetorical work intitled "Characters," and a few Metaphysical Fragments.

To Theophrastus we are indebted for preserving the works of Aristotle. See **ARISTOTLE**.

THEOPOMPUS, a celebrated Greek orator and historian, was born in the island Chios, and flourished in the reign of Alexander the Great. He was one of the most famous of all the disciples of Isocrates, and won the prize from all the panegyrist whom Artemisia invited to praise Mausolus. He wrote several works, which are lost.

THEOREM, a proposition which terminates in theory, and which considers the properties of things already made or done; or it is a speculative proposition deduced from comparing together several definitions. A theorem is something to be proved, and a problem something to be done.

THEORETIC, something relating to theory, or that terminates in speculation.

THEORY, in general, denotes any doctrine which terminates in speculation, without considering the practical uses or application thereof.

THEOSOPHISTS, a sect of men who pretend to derive all their knowledge from divine illumination. They boast that, by means of this celestial light, they are not only admitted to the intimate knowledge of God, and of all divine truth, but have access to the most sublime secrets of nature. They ascribe it to the singular manifestation of divine benevolence, that they are able to make such a use of the element of fire, in the chemical art, as enables them to discover the essential principles of bodies, and to disclose stupendous mysteries in the physical world. They even pretend to an acquaintance with those celestial beings which form the medium of intercourse between God and man, and to a power of obtaining from them, by the aid of magic, astrology, and other similar arts, various kinds of information and assistance.

To this class belonged Paracelsus, Robert Fludd, Jacob Boehmen, Van Helmont, Peter Poiret, and the Rosicrucians. They are also called *FIRE-Philosophers*, which see.

THERAPEUTÆ, a term applied to those that are wholly in the service of religion. This general term has been applied to particular sects of men, concerning whom there have been great disputes among the learned.

THERAPEUTICS, that part of medicine which acquaints us with the rules that are to be observed, and the medicines to be employed, in the cure of diseases.

THERIACA ANDROMACHI, a compound medicine made in the form of an electuary. See **PHARMACY**, n° 605.

THERMÆ, hot baths or bagnios. Luxury and extravagance were in nothing carried to such heights as in the thermæ of the Roman emperors. Ammian complains, that they were built to such an extent as to equal whole provinces; from which Valesius would abate, by reading *piscinæ* instead of *provincia*. And yet after all, the remains of some still standing are sufficient testimonies for Ammian's censure; and the accounts transmitted of their ornaments and furniture, such as being laid with precious stones (Seneca), set round with seats of solid silver (Pliny), with pipes and cisterns of the same metal (Statius), add to, rather than take from, the censure. The most remarkable bagnios were those of Dioclesian and Caracalla at Rome, great part of which remains at this day; the lofty arches, stately pillars, variety of foreign marble, curious vaulting of the roofs, great number of spacious apartments, all attract the curiosity of the traveller. They had also their summer and winter baths.

THERMOMETER, an instrument for measuring the degree of heat or cold in any body.

The thermometer was invented about the beginning of the 17th century; but, like many other useful inventions, it has been found impossible to ascertain to whom the honour of it belongs. Boerhaave * ascribes it to Cornelius Drebbel of Almar, his own countryman. Fulgenzio † attributes it to his master Paul Sarpi, the great oracle of the Venetian republic; and Viviani gives the honour of it to Galilæo §. But all these are posthumous claims. Sanctorio ‡ claims this honour to himself; and his assertion is corroborated by Borelli § and Malpighi * of the Florentine academy, whose partiality is not to be suspected in favour of a member of the Patavinian school.

Perhaps the best way to reconcile these different claims would be, to suppose that the thermometer was really invented by different persons about the same time. We know that there are certain periods in the progress of the arts when the stream of human genius runs in the same direction, and moves towards the same object. That part of the current which reaches the object first may possess the title; but the other parts follow so rapidly and arrive so soon after, that it is impossible for a spectator to decide which is first in point of time.

The first form of this instrument for measuring the degrees of heat and cold, was the air-thermometer. It is a well known fact that air expands with heat so as to occupy more space than it does when cold, and that it is condensed by cold so as to occupy less space than when warmed, and that this expansion and condensation is greater or less according to the degree of heat or cold applied. The principle then on which the air-thermometer was constructed is very simple. The air was confined in a tube by means of some coloured liquor; the liquor rose or fell according as the air became expanded or condensed. What the first form of the tube was, cannot now perhaps be well known; but the following description of the air-thermometer will fully explain its nature.

The air-thermometer consists of a glass tube BE, connected by a glass tube with a reservoir of liquor, as in Plate DVI. fig. 1.

Enfield's
History of
Philosophy.

Ibid.

Thermometer.

of the thermometer.
Martine's
Essays.
* Chem. I.
p. 152, 156.
† Life F.
Paul, p.
158.
§ Vit. Gal.
lib. p. 67.
† Corn. in
Galen. p.
736—843.
De Mot.
Animal. II.
prop. 175.
* Opera
Posth. p. 30.

The air-thermometer described.

Thermo-
meter.

nected at one end with a large glass ball A, and at the other end immersed in an open vessel, or terminating in a ball DE, with a narrow orifice at D; which vessel, or ball, contains any coloured liquor that will not easily freeze. Aquafortis tinged of a fine blue colour with a solution of vitriol or copper, or spirit of wine tinged with cochineal, will answer this purpose. But the ball A must be first moderately warmed, so that a part of the air contained in it may be expelled through the orifice D; and then the liquor pressed by the weight of the atmosphere will enter the ball DE, and rise, for example, to the middle of the tube at C, at a mean temperature of the weather; and in this state the liquor by its weight, and the air included in the ball A, &c. by its elasticity, will counterbalance the weight of the atmosphere. As the surrounding air becomes warmer, the air in the ball and upper part of the tube, expanding by heat, will drive the liquor into the lower ball, and consequently its surface will descend; on the contrary, as the ambient air becomes colder, that in the ball is condensed, and the liquor pressed by the weight of the atmosphere will ascend: so that the liquor in the tube will ascend or descend more or less according to the state of the air contiguous to the instrument. To the tube is affixed a scale of the same length, divided upwards and downwards from the middle C into 100 equal parts, by means of which the ascent and descent of the liquor in the tube, and consequently the variations in the cold or heat of the atmosphere, may be observed.

3
Its defects.

This instrument was extremely defective; for the air in the tube was not only affected by the heat and cold of the atmosphere, but also by its weight.

4
The spirit
of wine
thermo-
meter.

The air being found improper for measuring with accuracy the variations of heat and cold according to the form of the thermometer which was first adopted, another fluid was proposed about the middle of the 17th century by the Florentine academy. This fluid was spirit of wine, or alcohol, as it is now generally named. The alcohol being coloured, was inclosed in a very fine cylindrical glass tube previously exhausted of its air, having a hollow ball at one end A, and hermetically sealed at the other end D. The ball and tube are filled with rectified spirit of wine to a convenient height, as to C, when the weather is of a mean temperature, which may be done by inverting the tube into a vessel of stagnant coloured spirit, under a receiver of the air-pump, or in any other way. When the thermometer is properly filled, the end D is heated red hot by a lamp, and then hermetically sealed, leaving the included air of about $\frac{1}{3}$ of its natural density, to prevent the air which is in the spirit from dividing it in its expansion. To the tube is applied a scale, divided from the middle, into 100 equal parts, upwards and downwards.

As spirit of wine is capable of a very considerable degree of rarefaction and condensation by heat and cold, when the heat of the atmosphere increases the spirit dilates, and consequently rises in the tube; and when the heat decreases, the spirit descends, and the degree or quantity of the motion is shown by a scale.

5
Its defects.

The spirit of wine thermometer was not subject to some of the inconveniences which attended the air thermometer. In particular, it was not affected by variations in the weight of the atmosphere: accordingly it soon came into general use among philosophers. It was, at an early period, introduced into Britain by Mr Boyle. To this instrument, as then used, there are, however, many objections. The liquor was of different degrees of strength, and therefore different tubes filled with it, when exposed to the same degree of heat, would not correspond. There was also another defect: The scale which was adjusted to the thermometer did not commence at any fixed point. The highest term was ad-

justed to the great sunshine heats of Florence, which are too variable and undetermined; and frequently the workman formed the scale according to his own fancy. While the thermometer laboured under such disadvantages it could not be of general use.

To obtain some fixed unalterable point by which a determined scale might be discovered, to which all thermometers might be accurately adjusted, was the subject which next drew the attention of philosophers. Mr Boyle, who seems at an early period to have studied this subject with much anxiety, proposed the freezing of the essential oil of anniseeds as a convenient point for graduating thermometers; but this opinion he soon laid aside. Dr Halley next proposed that thermometers should be graduated in a deep pit underground, where the temperature both in winter and summer is pretty uniform; and that the point to which the spirit of wine should rise in such a subterraneous place should be the point from which the scale should commence. But this proposal was evidently attended with such inconveniences that it was soon abandoned. He made experiments on the boiling point of water, of mercury, and of spirit of wine; and he seems rather to give a preference to the spirit of wine. He objected to the freezing of water as a fixed point, because he thought that it admitted considerable latitude.

It seems to have been reserved to the all-conquering genius of Sir Isaac Newton to determine this important point, on which the accuracy and value of the thermometer depends. He chose, as fixed, those points at which water freezes and boils; the very points which the experiments of succeeding philosophers have determined to be the most fixed and convenient. Sensible of the disadvantages of spirit of wine, he tried another liquor which was homogeneous enough, capable of a considerable rarefaction, about 15 times greater than spirit of wine. This was linseed oil. It has not been observed to freeze even in very great colds, and it bears a heat about four times that of water before it boils. With these advantages it was made use of by Sir Isaac Newton, who discovered by it the comparative degree of heat for boiling water, melting wax, boiling spirit of wine, and melting tin; beyond which it does not appear that this thermometer was applied. The method he used for adjusting the scale of this oil thermometer was as follows: Supposing the bulb, when immersed in thawing snow, to contain 10,000 parts, he found the oil expand by the heat of the human body so as to take up $\frac{1}{3}$ th more space, or 10,256 such parts; and by the heat of water boiling strongly 10,725; and by the heat of melting tin 11,516. So that reckoning the freezing point as a common limit between heat and cold, he began his scale there, marking it 0, and the heat of the human body he made 12°; and consequently, the degrees of heat being proportional to the degrees of rarefaction, or $256 : 725 :: 12 : 34$, this number 34 will express the heat of boiling water; and by the same rule, 72 that of melting tin. This thermometer was constructed in 1701.

To the application of oil as a measure of heat and cold, there are insuperable objections. It is so viscid, that it adheres too strongly to the sides of the tube. On this account it ascends and descends too slowly in case of a sudden heat or cold. In a sudden cold, so great a portion remains adhering to the sides of the tube after the rest has subsided, that the surface appears lower than the corresponding temperature of the air requires. An oil thermometer is therefore not a proper measure of heat and cold.

All the thermometers hitherto proposed, were liable to many inconveniences, and could not be considered as exact standards for pointing out the various degrees of temperature. This led Reaumur to attempt a new one, an account of which was published in the year 1730 in the *Mé-*

Thermo-
meter.6
Different
fixed points
proposed by
philosophers.* Phil.
Trans. Abrs.
II. 34.7
Sir Isaac
Newton's
oil thermo-
meter.Phil.
Trans. n°
270. or Abrs.
vol. iv. part. 2.8
Its imper-
fections.9
Reaumur's
spirit of
wine ther-
mometer.

moirs.

Thermo-
meter.

Martine's
Essays on
the Construc-
tion of Ther-
mometers.

10
Its defects.

11
Mercurial
thermome-
ters.

* Phil.
Transf. vol.
xvii. or
Abr. vol. ii.

moirs of the Academy of Sciences. This thermometer was made with spirit of wine. He took a large ball and tube, the dimensions and capacities of which were known; he then graduated the tube, so that the space from one division to another might contain 1000th part of the liquor; the liquor containing 1000 parts when it stood at the freezing point. He adjusted the thermometer to the freezing point by an artificial congelation of water: then putting the ball of his thermometer and part of the tube into boiling water, he observed whether it rose 80 divisions: if it exceeded these, he changed his liquor, and by adding water lowered it, till upon trial it should just rise 80 divisions; or if the liquor, being too low, fell short of 80 divisions, he raised it by adding rectified spirit to it. The liquor thus prepared suited his purpose, and served for making a thermometer of any size, whose scale would agree with his standard.

This thermometer was far from being perfect. As the bulbs were three or four inches in diameter, the surrounding ice would be melted before its temperature could be propagated to the whole spirits in the bulb, and consequently the freezing point would be marked higher than it should be. Dr Martine accordingly found, that instead of coinciding with the 32d degree of Fahrenheit, it corresponded with the 34th, or a point a little above it. Reaumur committed a mistake also respecting the boiling point; for he thought that the spirit of wine, whether weak or strong, when immersed in boiling water, received the same degree of heat with the boiling water. But it is well known that highly rectified spirit of wine cannot be heated much beyond the 175th degree of Fahrenheit, while boiling water raises the quicksilver 37 degrees higher. There is another thermometer that goes by the name of *Reaumur's*, which shall be afterwards described.

At length a different fluid was proposed, by which thermometers could be made free from most of the defects hitherto mentioned. This fluid was mercury, and seems first to have occurred to Dr Halley in the last century; but was not adopted by him on account of its having a smaller degree of expansibility than the other fluids used at that time*. Boerhaave says that the mercurial thermometer was first constructed by Olaus Roemer; but the honour of this invention is generally given to Fahrenheit of Amsterdam, who presented an account of it to the Royal Society of London in 1724.

That we may judge the more accurately of the propriety of employing mercury, we will compare its qualities with those of the fluids already mentioned, air, alcohol, and oil.

Air is the most expansible fluid, but it does not receive nor part with its heat so quickly as mercury. Alcohol does not expand much by heat. In its ordinary state it does not bear a much greater heat than 175° of Fahrenheit; but when highly rectified it can bear a greater degree of cold than any other liquor hitherto employed as a measure of temperature. At Hudson's Bay, Mr Macnab, by a mixture of vitriolic acid and snow, made it to descend to 69 below 0 of Fahrenheit. There is an inconvenience, however, attending the use of this liquor; it is not possible to get it always of the same degree of strength. As to oil, its expansion is about 15 times greater than that of alcohol; it sustains a heat of 600°, and its freezing point is so low that it has not been determined; but its viscosity renders it useless.

Mercury is far superior to alcohol and oil, and is much more manageable than air. 1. As far as the experiments already made can determine, it is of all the fluids hitherto employed in the construction of thermometers, that which measures most exactly equal differences of heat by equal differences of its bulk: its dilatations are in fact very nearly proportional to the augmentations of heat applied to it (A). 2. Of all liquids it is the most easily freed from air. 3. It is fitted to measure high degrees of heat and cold. It sustains a heat of 600° of Fahrenheit's scale, and does not congeal till it fall 39 or 40 degrees below 0. 4. It is the most sensible of any fluid to heat and cold, even air not excepted. † Sir Benjamin Thompson, now Count Rumford, found that mercury was heated from the freezing to the boiling point in 58 seconds, while water took two minutes 13 seconds, and common air 10 minutes and 17 seconds. 5. Mercury is a homogeneous fluid, and every portion of it is equally dilated or contracted by equal variations of heat. Any one thermometer made of pure mercury is, *ceteris paribus*, possessed of the same properties with every other thermometer made of pure mercury. Its power of expansion is indeed about six times less than that of spirit of wine, but it is great enough to answer most of the purposes for which a thermometer is wanted.

The fixed points which are now universally chosen for adjusting

(A) We have affirmed that the expansions of the bulk of quicksilver by heat are nearly (for they are not strictly so) in a regular arithmetical progression, according to the quantity of heat it is exposed to; and such seems to be the case according to the Table published by Mr de Luc, at page 309. of his first volume on the Modifications of the Atmosphere. The following extract of this table shows these variations: and the first and second differences are added, in order to render these irregularities more sensible. They are such as can hardly be conceived from the nature of any substance, without the influence of extraneous and accidental causes, which may have escaped the attention of the observer; neither have they been found exactly true by Dr Crawford. Mr de Luc supposes the whole heat from melting ice to that of boiling water to be divided into 80 parts; by the fractional subdivisions of which he expresses the absolute quantities of heat, answering to each 5, or 10 degrees of Reaumur's thermometer (= 22,5 of Fahrenheit's scale); so that the whole sum of these fractions amounts exactly to the assumed number 80. They are as follow:

Degrees	Reaumur's Thermometer.	Fahrenheit's Thermometer.	Quantities of heat.	First differences.	Second differences.
	80	212			
	70	189,5	9,44	216	
	60	167	9,60	210	+ ,06
	50	144,5	9,70	216	- ,06
	40	122	9,86	222	- ,06
	30	99,5	10,08	212	+ ,10
	20	77	10,20	218	- ,06
	10	54,5	10,38	256	- ,18
	0	32	10,74		

Thermo-
meter.

12
Properties
of air, al-
cohol, and
oil.

13
Thermo-
metrical
properties
of mercury.

Recherches
sur les Mod.
de l'Atmo-
sphere.

Phil.
Transf. for
1786.

14
Fixed
adjusting
points.

Crawford's
Mineralogy,
vol. ii.

Thermo-
meter.

adjusting thermometers to a scale, and to one another, are the boiling and freezing water points. The boiling water point, it is well known, is not an invariable point, but varies some degrees according to the weight and temperature of the atmosphere. In an exhausted receiver, water will boil with a heat of 98° or 100°; whereas in Papin's digester it will acquire a heat of 412. Hence it appears that water will boil at a lower point, according to its height in the atmosphere, or to the weight of the column of air which presses upon it. In order to ensure uniformity therefore in the construction of thermometers, it is now agreed that the bulb of the tube be plunged in the water when it boils violently, the barometer standing at 30 English inches (which is its mean height round London), and the temperature of the atmosphere 55°. A thermometer made in this way, with its boiling point at 212°, is called by Dr Horsley *Bird's Fahrenheit*, because Mr Bird was the first person who attended to the state of the barometer in constructing thermometers.

15
Rule for
adjusting
thermome-
ters to
these.Phil.
Transf. for
1775 and
1778.

As artists may be often obliged to adjust thermometers under very different pressures of the atmosphere, philosophers have been at pains to discover a general rule which might be applied on all occasions. M. de Luc, in his *Recherches sur les Mod. de l'Atmosphere* from a series of experiments, has given an equation for the allowance on account of this difference, in Paris measure, which has been verified by Sir George Schuckburgh †; also Dr Horsley, Dr Maskelyne, and Sir George Schuckburgh, have adapted the equation and rules to English measures, and have reduced the allowances into tables for the use of the artist. Dr Horsley's rule, deduced from De Luc's, is this:

$$\frac{99}{8990000} \log. z - 92.804 = b.$$

where b denotes the height of a thermometer plunged in boiling water, above the point of melting ice, in degrees of Bird's Fahrenheit, and z the height of the barometer in 10ths of an inch. From this rule he has computed the following table, for finding the heights, to which a good Bird's Fahrenheit will rise when plunged in boiling water, in all states of the barometer, from 27 to 31 English inches; which will serve, among other uses, to direct instrument-makers in making a true allowance for the effect of the variation of the barometer, if they should be obliged to finish a thermometer at a time when the barometer is above or below 30 inches; though it is best to fix the boiling point when the barometer is at that height.

Equation of the Boiling Point.

Barometer.	Equation.	Difference.
31.0	+ 1.57	0.78
30.5	+ 0.79	0.79
30.0	0.00	0.80
29.5	- 0.80	0.82
29.0	- 1.62	0.83
28.5	- 2.45	0.85
28.0	- 3.31	0.86
27.5	- 4.16	0.88
27.0	- 5.04	

The numbers in the first column of this table express heights of the quicksilver in the barometer in English inches and decimal parts: the second column shows the equation to be applied, according to the sign prefixed, to 212° of Bird's Fahrenheit, to find the true boiling point for every such state of the barometer. The boiling point for all intermediate states of the barometer may be had with sufficient accuracy, by taking proportional parts, by means of the

third column of differences of the equations. See *Phil. Transf.* lxiv. art. 30.; also Dr Maskelyne's *Paper*, vol. lxiv. art. 20.

In the following table we have the result of 15 different observations made by Sir George Schuckburgh compared with the result of M. de Luc's rules.

Height of the Barometer reduced to the same temperature of 50°	Mean boiling Point by Observation.	Boiling Point by De Luc's Rules.	Height of Barometer.	Boiling Point by Observation.	Boiling Point by De Luc's Rules.
Inch.	°	°	Inch.	°	°
26.498	207.07	208.54	30.008	213.22	213.47
27.241	208.64	208.84	30.207	213.58	213.79
27.954	209.87	210.03	30.489	214.15	214.23
28.377	210.50	210.81	30.763	214.37	214.66
28.699	211.27	211.34	30.847	214.83	214.79
28.898	211.50	211.67	30.957	214.96	214.96
28.999	211.60	211.85			
29.447	212.55	212.74			
29.805	212.95	213.15			

Sir George Schuckburgh has also subjoined the following general table for the use of artists in constructing the thermometer, both according to his own observations and those of M. de Luc.

Height of the Barometer.	Correct of the boiling point.	Difference	Correct accord. to M. de Luc.	Difference.
	°		°	
26.0	- 7.09	,91	- 6.83	,90
26.5	- 6.18	,91	- 5.93	,89
27.0	- 5.27	,90	- 5.04	,88
27.5	- 4.37	,89	- 4.16	,87
28.0	- 3.48	,89	- 3.31	,86
28.5	- 2.59	,87	- 2.45	,83
29.0	- 1.72	,87	- 1.62	,82
29.5	- 0.85	,85	- 0.80	,80
30.0	0.00	,85	0.00	,79
30.5	+ 0.85	,84	+ 0.79	,78
31.0	+ 1.69		+ 1.57	

The Royal Society, fully apprized of the importance of adjusting the fixed points of thermometers, appointed a committee of seven gentlemen to consider of the best method for this purpose; and their report is published in the *Phil. Transf.* vol. lxvii. part ii. art. 37.

They observed, that though the boiling point be placed so much higher on some of the thermometers now made than on others, yet this does not produce any considerable error in the observations of the weather, at least in this climate; for an error of 1° in the position of the boiling point, will make an error only of half a degree in the position of 92°, and of not more than a quarter of a degree in the point of 62°. It is only in nice experiments, or in trying the heat of hot liquors, that this error in the boiling point can be of much importance.

In adjusting the freezing as well as the boiling point, the quicksilver in the tube ought to be kept of the same heat as that in the ball. When the freezing point is placed at a considerable distance from the ball, the pounded ice should be piled to such a height above the ball, that the error which can arise from the quicksilver in the remaining part of the tube not being heated equally with that in the ball, shall be very small, or the observed point must be corrected on that account according to the following table:

Heat

Thermo-
meter.17
Sir George
Schuckburgh's ob-
servations
compared
with De
Luc's rules.18
Observa-
tions made
by a com-
mittee of
the Royal
Society for
adjusting
the fixed
points.

Thermo-
meter.19
Table for
correcting
the freez-
ing point.

Heat of the Air.	Correction.
42°	,00087
52	,00174
62	,00261
72	,00348
82	,00435

The correction in this table is expressed in 1000th parts of the distance between the freezing point and the surface of the ice: e. g. if the freezing point stands seven inches above the surface of the ice, and the heat of the room is 62, the point of 32° should be placed 7×00261 , or .018 of an inch lower than the observed point. A diagonal scale will facilitate this correction.

20
The quick-
silver in
the tube
ought to
be heated
to the same
degree as
that in the
ball.

The committee observe, that in trying the heat of liquors, care should be taken that the quicksilver in the tube of the thermometer be heated to the same degree as that in the ball; or if this cannot be done conveniently, the observed heat should be corrected on that account; for the manner of doing which, and a table calculated for this purpose, we must refer to their excellent report in the Phil. Trans. vol. lxvii. part ii. art. 37.

21
The tubes
ought to
be cylindri-
cal and ca-
pillary.

|| Lecons de
Phys. Exp.
tom. iv. p.
376.

With regard to the choice of tubes, they ought to be exactly cylindrical. But though the diameter should vary a little, it is easy to manage that matter in the manner proposed by the Abbé Nollet ||, by making a small portion of the quicksilver, e. g. as much as fills up an inch or half an inch, slide backward and forward in the tube; and thus to find the proportions of all its inequalities, and from thence to adjust the divisions to a scale of the most perfect equality. The capillary tubes are preferable to others, because they require smaller bulbs, and they are also more sensible, and less brittle. The most convenient size for common experiments has the internal diameter about the 40th or 50th of an inch, about 9 inches long, and made of thin glass, that the rise and fall of the mercury may be better seen.

22
The num-
ber of de-
grees into
which the
scale ought
to be divi-
ded.

The next thing to be considered, is of what number of degrees or divisions the scale ought to consist, and from what point it ought to commence. As the number of the divisions of the scale is an arbitrary matter, the scales which have been employed differ much from one another in this circumstance. Fahrenheit has made 180 degrees between the freezing and boiling water point. Amonton's made 73, and Sir Isaac Newton only 34. There is, however, one general maxim, which ought to be observed: *That such an arithmetical number should be chosen as can easily be divided and subdivided, and that the number of divisions should be so great that there shall seldom be occasion for fractions.* The number 80 chosen by Reaumur answers extremely well in this respect, because it can be divided by several figures without leaving a remainder; but it is too small a number: the consequence of which is, that the degrees are placed at too great a distance from one another, and fractions must therefore be often employed. We think, therefore, that 160 would have been a more convenient number. Fahrenheit's number 180 is large enough, but when divided its quotient soon becomes an odd number.

23
At what
point the
scale ought
to com-
mence.

As to the point at which the scale ought to commence, various opinions have been entertained. If we knew the beginning or lowest degree of heat, all philosophers would agree, that the lowest point of the thermometer ought to be fixed there; but we know neither the lowest nor the highest degrees of heat; we observe only the intermediate parts. All that we can do, then, is to begin it at some invariable

point, to which thermometers made in different places may easily be adjusted. If possible too, it ought to be a point at which a natural well-known body receives some remarkable change from the effects of heat or cold. Fahrenheit began his scale at the point at which snow and salt congeal. Kirwan proposes the freezing point of mercury. Sir Isaac Newton, Hales, and Reaumur adopted the freezing point of water. The objection to Fahrenheit's lowest point is, that it commences at an artificial cold never known in nature, and to which we cannot refer our feelings, for it is what few can ever experience. There would be several great advantages gained, we allow, by adopting the freezing point of mercury. It is the lowest degree of cold to which mercury can be applied as a measure; and it would render unnecessary the use of the signs plus and minus, and the extension of the scale below 0. But we object to it, that it is not a point well known; for few, comparatively speaking, who use thermometers, can have an opportunity of seeing mercury congealed. As to the other advantage to be gained by adopting the freezing point of mercury, namely, the abolition of negative numbers, we do not think it would counterbalance the advantage to be enjoyed by using a well-known point. Besides, it may be asked, Is there not a propriety in using negative numbers to express the degree of cold, which is a negative thing? Heat and cold we can only judge of by our feelings: the point then at which the scale should commence, ought to be a point which can form to us a standard of heat and cold; a point familiar to us from being one of the most remarkable that occurs in nature, and therefore a point to which we can with most clearness and precision refer to in our minds on all occasions. This is the freezing point of water chosen by Sir Isaac Newton, which of all the general changes produced in nature by cold is the most remarkable. It is therefore the most convenient point for the thermometers to be used in the temperate and frigid zones; we may say over the globe, for even in the hottest countries of the torrid zone many of the mountains are perpetually covered with snow.

Having now explained the principles of the thermometer as fully as appears necessary, in order to make it properly understood, we will now subjoin an account of those thermometers which are at present in most general use. These are Fahrenheit's, De l'Isle's, Reaumur's, and Celsius's. Fahrenheit's is used in Britain, De l'Isle's in Russia, Reaumur's in France, and Celsius's in Sweden. They are all mercurial thermometers.

Fahrenheit's thermometer consists of a slender cylindrical tube and a small longitudinal bulb. To the side of the tube is annexed a scale which Fahrenheit divided into 600 parts, beginning with that of the severe cold which he had observed in Iceland in 1709, or that produced by surrounding the bulb of the thermometer with a mixture of snow or beaten ice and sal ammoniac or sea salt. This he apprehended to be the greatest degree of cold, and accordingly he marked it, as the beginning of his scale, with 0; the point at which mercury begins to boil, he conceived to show the greatest degree of heat, and this he made the limit of his scale. The distance between these two points he divided into 600 equal parts or degrees; and by trials, he found that the mercury stood at 32 of these divisions, when water just begins to freeze, or snow or ice just begins to thaw; it was therefore called the degree of the freezing point. When the tube was immersed in boiling water, the mercury rose to 212, which therefore is the boiling point, and is just 180 degrees above the former or freezing point. But the present method of making the scale of these thermometers, which is the sort in most common use, is first to immerse the bulb of the thermometer in ice or snow

Thermo-
meter.24
Only four
thermome-
ters gene-
rally used.25
Fahren-
heit's de-
scribed.

Thermo-
meter.

snow just beginning to thaw, and mark the place where the mercury stands with a 32; then immerse it in boiling water, and again mark the place where the mercury stands in the tube, which mark with the num. 212, exceeding the former by 180; dividing therefore the intermediate space into 180 equal parts, will give the scale of the thermometer, and which may afterwards be continued upwards and downwards at pleasure.

Other thermometers of a similar construction have been accommodated to common use, having but a portion of the above scale. They have been made of a small size and portable form, and adapted with appendages to particular purposes; and the tube with its annexed scale has often been enclosed in another thicker glass tube, also hermetically sealed, to preserve the thermometer from injury. And all these are called *Fahrenheit's thermometers*.

26
De l'Isle's
thermome-
ter.
Plate
DVII.

In 1733, M. De l'Isle of Petersburg constructed a mercurial thermometer on the principles of Reaumur's spirit thermometer. In his thermometer, the whole bulk of quicksilver, when immersed in boiling water, is conceived to be divided into 100,000 parts; and from this one fixed point the various degrees of heat, either above or below it, are marked in these parts on the tube or scale, by the various expansion or contraction of the quicksilver, in all imaginable varieties of heat.—Dr Martine apprehends it would have been better if De l'Isle had made the integer 100,000 parts, or fixed point, at freezing water, and from thence computed the dilatations or condensations of the quicksilver in those parts; as all the common observations of the weather, &c. would have been expressed by numbers increasing as the heat increased, instead of decreasing, or counting the contrary way. However, in practice it will not be very easy to determine exactly all the divisions from the alteration of the bulk of the contained fluid. And besides, as glass itself is dilated by heat, though in a less proportion than quicksilver, it is only the excess of the dilatation of the contained fluid above that of the glass that is observed; and therefore if different kinds of glass be differently affected by a given degree of heat, this will make a seeming difference in the dilatations of the quicksilver in the thermometers constructed in the Newtonian method, either by Reaumur's rules or De l'Isle's. Accordingly it has been found, that the quicksilver in De l'Isle's thermometers has stood at different degrees of the scale when immersed in thawing snow: having stood in some at 154°, while in others it has been at 156° or even 158°.

27
Reaumur's,
or rather
De Luc's
thermome-
ter.

The thermometer presently used in France is called *Reaumur's*; but it is very different from the one originally invented by Reaumur in 1730, and described in the Memoirs of the Academy of Sciences. The one invented by Reaumur was filled with spirit of wine; and tho' its scale was divided by the author into 80 parts, of which 0 was the freezing point and 80 the boiling water point, yet in fact 80 was only the boiling point of the spirit of wine that he employed, which, as Dr Martine computes, corresponded with 180 of Fahrenheit. But the thermometer now in use in France is filled with mercury; and the boiling water point, which is at 80, corresponds with the 212th degree of Fahrenheit. The scale indeed commences at the freezing point, as the old one did. The new thermometer ought more properly to be called *De Luc's thermometer*, for it was first made by De Luc; and is in fact as different from Reaumur's as it is from Sir Isaac Newton's. When De Luc had fixed the scale, and finished an account of it, he showed the manuscript to M. De la Condamine. Condamine advised him to change the number 80; remarking, that such was the inattention of physicians, that they would probably confound it with Reaumur's. De Luc's modesty, as well as a predilection

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for the number 80, founded, as he thought, on philosophical reasons, made him decline following this advice. But he found by experience that the prediction of Condamine was too well founded.

The thermometer of Celsius, which is used in Sweden, has a scale of 100 degrees from the freezing to the boiling water point.

These are the principal thermometers now used in Europe; and the temperatures indicated by any of them may be reduced into the corresponding degrees on any of the others by means of the following simple canons; in which R signifies the degrees on the scale of Reaumur, F those of Fahrenheit, and S those of the Swedish thermometer.

1. To convert the degrees of Reaumur into those of Fahrenheit; $\frac{R \times 9}{4} + 32 = F$.

2. To convert the degrees of Fahrenheit into those of Reaumur; $\frac{F - 32 \times 4}{9} = R$.

3. To convert the Swedish degrees into those of Fahrenheit; $\frac{S \times 9}{5} + 32 = F$.

4. To convert Fahrenheit's into Swedish; $\frac{F - 32 \times 5}{9} = S$.

5. To convert Swedish degrees into those of Reaumur; $\frac{S \times 4}{5} = R$.

6. To convert Reaumur's degrees into Swedish; $\frac{R \times 5}{4} = S$.

To such readers as are unacquainted with the algebraic expression of arithmetical formulæ, it will be sufficient to express one or two of these in words to explain their use.—

1. Multiply the degree of Reaumur by 9, divide the product by 4, and to the quotient add 32, the sum expresses the degree on the scale of Fahrenheit.—2. From the degree of Fahrenheit subtract 32, multiply the remainder by 4, and divide the product by 9, the quotient is the degree according to the scale of Reaumur, &c.

As many other thermometers have been used besides these, and consequently observations taken by them, it is of importance to have them placed in such a point of view that they may be easily compared with any of these four now in general use. We therefore give them in Plate DVII. in the same order as they were arranged by Dr Martine in his valuable Essay on the Construction and Graduation of Thermometers, and at the same time adding those of Celsius and De Luc. We call it by the name of De Luc for the sake of distinguishing it from Reaumur's spirit of wine thermometer, which may be seen in the same Plate.

It is unnecessary to describe any of these more minutely, as they are no longer used. Those who wish to read a more particular account of them may consult Dr Martine's Essays.

As in meteorological observations it is necessary to attend to the greatest rise and fall of the thermometer, attempts have been made to construct a thermometer which might register the greatest degree of heat, or greatest degree of cold, which took place during the absence of the observer. In 1757 Lord Charles Cavendish presented to the Royal Society of London a thermometer in two different forms; the one contrived to mark the greatest degree of heat, and the other the greatest degree of cold.

The first consists of a glass tube AB, with a cylindrical bulb B at the lower end, and capillary at the top, over which there is fixed a glass ball C. The bulb and part of the tube are filled with mercury, the top of which shows the degrees

Thermo-
meter.

28

Celsius's
thermo-
meter.

29

How to
compare
these to-
gether.Lavoisier's
Elements of
Chemistry.

30

Account
of self regi-
stering
thermome-
ters.

31

Lord
Charles
Cavendish's
thermome-
ter.Plate
DVI.
Fig. 3.

Thermo-
meter.

degrees of heat as usual. The upper part of the tube above the mercury is filled with spirit of wine; the ball C is also filled with the same liquor almost to the top of the capillary tube. When the mercury rises the spirit of wine is also raised, and falls into the ball C, which is so made that the liquor cannot return into the tube when the mercury sinks; consequently the height of the spirit of wine in the ball, added to that in the tube, will give the greatest degree of heat to which the thermometer has pointed since last observation. When a new observation is to be made, the instrument must be inclined till the liquor in the ball cover the end of the capillary tube.

In this thermometer it is evident that the mercury must be affected by the weight and elasticity of the spirit of wine, and therefore it will not correspond to any of the common mercurial thermometers.

The thermometer for showing the greatest degree of cold is represented in fig. 4. by the crooked tube ABCD. This instrument is filled with spirit of wine, with the addition of as much mercury as is sufficient to fill both legs of the syphon, and about a fourth or fifth part of the hollow ball C. We are not told what the proportion of mercury was to that of spirit of wine. The degrees of heat are shown by the rise or fall of the mercury in the leg AB. The thermometer marks the greatest fall by means of the hollow ball C. When the mercury in the longer leg sinks by cold, that in the shorter will rise and run over into the ball C, from which it cannot return when the mercury subsides in the shorter and rises in the longer leg. The upper part of the shorter leg will therefore be filled with a column of spirits of a length proportional to the increase of heat; the bottom or lower surface of which, by means of a proper scale, will show how much the mercury has been lower than it is; which being subtracted from the present height will give the lowest point to which the mercury has fallen. That the thermometer may be fitted for a new observation, the mercury must be made to run back from the ball into the shorter leg, by inclining the tube and heating the ball.

32
Mr Six's
thermome-
ter.

Fig. 5.

In 1782 Mr Six proposed another self-registering thermometer. It is properly a spirit of wine thermometer, though mercury is also employed for supporting an index. *ab* is a thin tube of glass 16 inches long, and $\frac{1}{8}$ th of an inch caliber: *cde* and *fgb* are smaller tubes about $\frac{1}{16}$ th of an inch caliber. These three tubes are filled with highly rectified spirit of wine, except the space between *d* and *g*, which is filled with mercury. As the spirit of wine contracts or expands in the middle tube, the mercury falls or rises in the outside tubes. An index, such as that represented in fig. 6. is placed on the surface, within each of these tubes, so light as to float upon it. *k* is a small glass tube $\frac{1}{4}$ th of an inch long, hermetically sealed at each end, and inclosing a piece of steel wire nearly of its own length. At each end *l*, *m*, of this small tube, a short tube of black glass is fixed, of such a diameter as to pass freely up and down within either of the outside tubes of the thermometer *ce* or *fb*. From the upper end of the index is drawn a spring of glass to the fineness of a hair, and about $\frac{1}{8}$ th of an inch long; which being placed a little oblique, presses lightly against the inner surface of the tube, and prevents the index from descending when the mercury descends. These indexes being inserted one into each of the outside tubes, it is easy to understand how they point out the greatest heat or cold that has happened in the observer's absence. When the spirit of wine in the middle tube expands, it presses down the mercury in the tube *bf*, and consequently raises it in the tube *ec*; consequently the index on the left hand tube is left behind and marks the greatest cold, and

the index in the right hand tube rises and marks the greatest heat.

Thermo-
meter.

In 1790 a paper was given into the Royal Society of Edinburgh, describing two thermometers, newly invented, by Dr John Rutherford of Middle Bailiff; the one for registering the highest and the other for registering the lowest degree of heat to which the thermometer has risen or fallen during the absence of the observer. An account of them may be found in the third volume of the Transactions of the Society.

A new self-registering thermometer has more lately been invented by Mr Keith of Ravelstone, which we consider as the most ingenious, simple, and perfect, of any which has hitherto appeared. Its simplicity is so great, that it requires only a very short description to make it intelligible.

AB is a thin glass tube about 14 inches long and $\frac{1}{8}$ th of an inch caliber, close or hermetically sealed at top. To the lower end, which is open, there is joined the crooked glass tube BE, seven inches long, and $\frac{1}{16}$ th of an inch caliber, and open at top. The tube AB is filled with the strongest spirit of wine, and the tube BE with mercury. This is properly a spirit of wine thermometer, and the mercury is used merely to support a piece of ivory or glass, to which is affixed a wire for raising one index or depressing another, according as the mercury rises or falls. E is a small conical piece of ivory or glass, of such a weight as to float on the surface of the mercury. To the float is joined a wire called the *float-wire*, which reaches upwards to H, where it terminates in a knee bent at right angles. The float-wire, by means of an eye at *a*, moves easily along the small harpichord wire GK. LL are two indexes made of thin black oiled silk, which slide upwards or downwards with a force not more than two grains. The one placed above the knee points out the greatest rise, and the one placed below it points out the greatest fall, of the thermometer.

Fig. 7.

When the instrument is to be prepared for an observation, both indexes are to be brought close to the knee H. It is evident, that when the mercury rises, the float and float wire, which can be moved with the smallest force, will be pushed upwards till the mercury become stationary. As the knee of the float-wire moves upwards it will carry along with it the upper index L. When the mercury again subsides, it leaves the index at the highest point to which it was raised, for it will not descend by its own weight: As the mercury falls the float-wire does the same; it therefore brings along with it the lower index L, and continues to depress it till it again become stationary or ascend in the tube; in which case it leaves the lower index behind it as it had formerly left the upper. The scale to which the indexes point is placed parallel to the slender harpichord wire. It may be seen more distinctly in fig. 8. That the scale and indexes may not be injured by the wind and rain, a cylindrical glass cover, close at top, and made so as to exactly fit the part FG, is placed over it.

The ingenious inventor has another improvement in contemplation, which, if upon trial it be found to answer, will make this thermometer as perfect as can be desired, provided there do not arise some errors from the variable pressure of the atmosphere. He proposes to adopt clock-work to this thermometer, in such a way as to register with the utmost precision the degrees of heat and cold for every month, day, and minute in the year. The principles on which this clockwork is to be formed we shall forbear to describe, hoping that the author himself, after his experiment has met with the success which we ardently wish, will favour the world with his own account of it.

The

Thermo-
meter.

The same ingenious gentleman has invented a self-registering barometer, upon the same principles with his self-registering thermometer. We have had the pleasure of seeing both; and are convinced that they will fully gratify the wishes of all who are engaged in meteorological studies. He is also in expectation of being soon able to produce an air-thermometer free from the defects of those which were formerly made, as he has found out a way of preventing it from being affected by the pressure of the atmosphere.

35
M. De
Luc's
sup-
posed im-
prove-
ments.

M. De Luc has described the best method of constructing a thermometer, fit for determining the temperature of the air, in the mensuration of heights by the barometer. He has also shown how to divide the scale of a thermometer, so as to adapt it for astronomical purposes in the observation of refractions.

36
Mr Caval-
lo has pro-
posed a
thermome-
trical baro-
meter.

Mr Cavallo, in 1781, proposed the construction of a thermometrical barometer, which, by means of boiling water, might indicate the various gravity of the atmosphere, or the height of the barometer. But as he does not say that the instrument has been tried with the desired success, we forbear to describe it. Those who wish to know his ideas respecting it may consult the Philosophical Transactions, vol. lxxi. p. 524.

37
The ther-
mometers
described
above too
limited.

The thermometers hitherto described are very limited in their extent; they indeed point out to us the lowest degrees of heat which are commonly observed even in cold climates, but they by no means reach to those degrees of heat which are very familiar to us. The mercurial thermometer extends no farther than to 600 of Fahrenheit's scale, the heat of boiling mercury; but we are sure that the heat of solid bodies, when heated to ignition, or till they emit light, far exceeds the heat of boiling mercury.

38
Sir Isaac
Newton's
method of
extending
the scale
of the ther-
mometer.

In order to remedy this defect, Sir Isaac Newton, whose genius overcame those obstacles which ordinary minds could not approach, attempted by an ingenious experiment to extend the scale to any degree required. Having heated a mass of iron red-hot, and exposed it to the cold air, he observed the time which elapsed till it became cold, or of the same temperature with the air; and when the heat so far decreased that he could apply some known measure (as a thermometer) to it, he observed the degrees of heat lost in given times; and thence drew the general conclusion, that the quantities of heat lost in given small spaces are always proportional to the heat remaining in the body, reckoning the heat to be the excess by which it is warmer than the ambient air. So that taking the number of minutes which it took to cool after it came to a determined point in an arithmetical progression, the decrements of the heat of the iron would be continually proportional. Having by this proportion found out the decrements of heat in a given time after it came to a known point, it was easy, by carrying upwards the same proportion to the beginning of its cooling, to determine the greatest heat which the body had acquired. This proportion of Sir Isaac's was found by Dr Martine to be somewhat inaccurate. The heat of a cooling body does not decrease exactly in proportion to that which the body retains. As the result of many observations, he found that two kinds of proportion took place, an arithmetical as well as the geometrical proportion which Sir Isaac Newton had adopted; namely, that the decrements of heat were partly proportional to the times (that is, that quantities of heat are lost in equal times), as well as partly in proportion to the remaining heat; and that if these two are added together the rule will be sufficiently accurate. By the geometrical proportion which Sir Isaac Newton adopted he discovered the heat of metals red-hot or in fusion.

Martine's
Essays.

This method, so successfully pursued by Sir Isaac, was sufficient to form a scale of high degrees of heat, but was not convenient for practical purposes. Accordingly the ingenious Mr Josiah Wedgwood, who is well known for his great improvement in the art of pottery, applied himself in order to discover a thermometer which might be easily managed. After many experiments recorded in the Philosophical Transactions, but which it is unnecessary to detail in this place, he has invented a thermometer which marks with much precision the different degrees of ignition from a dull red heat visible in the dark to the heat of an air-furnace. This thermometer is extremely simple. It consists of two rulers fixed upon a smooth flat plate, a little farther asunder at the one end than at the other, leaving an open longitudinal space between them. Small pieces of alum and clay mixed together are made of such a size as just to enter at the wide end; they are then heated in the fire along with the body whose heat we wish to determine. The fire, according to the degree of heat it contains, diminishes or contracts the earthy body, so that when applied to the wide end of the gage, it will slide on towards the narrow end, less or more according to the degree of heat to which it has been exposed.

Thermo-
meter.

39

That this instrument may be perfectly understood, we have given a representation of it in Plate DVI. fig. 9. ABCD is a smooth flat plate; and EF and GH two rulers or flat pieces, a quarter of an inch thick, fixed flat upon the plate, with the sides that are towards one another made perfectly true, a little farther asunder at one end EG than at the other end FH: thus they include between them a long converging canal, which is divided on one side into a number of small equal parts, and which may be considered as performing the offices both of the tube and scale of the common thermometer. It is obvious, that if a body, so adjusted as to fit exactly at the wider end of this canal, be afterwards diminished in its bulk by fire, as the thermometer pieces are, it will then pass further in the canal, and more and more so according as the diminution is greater; and conversely, that if a body, so adjusted as to pass on to the narrow end, be afterwards expanded by fire, as is the case with metals, and applied in that expanded state to the scale, it will not pass so far; and that the divisions on the side will be the measures of the expansions of the one, as of the contractions of the other, reckoning in both cases from that point to which the body was adjusted at first.

40

It is the body whose alteration of bulk is thus to be measured. This is to be gently pushed or slid along towards the end FH, till it is stopped by the converging sides of the canal.

Mr Wedgwood at first used clay for his thermometer pieces; but he soon found it impossible to procure fresh supplies of the same quality. He therefore had recourse to an artificial preparation. As the earth of alum is the pure argillaceous earth to which all clays owe their property of diminishing in the fire, he mixed some of this earth with the clay, and found it to answer his wishes completely, both in procuring the necessary degree of diminution and of increasing its unvitrescibility. The only way of ascertaining the proportion of alum earth to be added is by repeated trials. Mr Wedgwood found that 10 hundred weight of the porcelain clay of Cornwall required all the earth that was afforded by five hundred weight of alum. But as the clay or alum differs in quality, the proportion will also differ. There can now, however, be no difficulty in making thermometers of this kind, as common clay answers the purpose very well, and alum-earth can easily be procured. Those who wish to see a more particular account of this subject may peruse Mr Wedgwood's papers.

Philosophi-
cal Trans-
actions, vol.
lxxiv.

41

Thermometer.

papers in the Philosophical Transactions for 1782, 1784, and 1786.

As Mr Wedgwood's thermometer begins at the lowest degree of ignition, and Fahrenheit's goes no higher than the boiling point of mercury, Mr Wedgwood continued to fill up the interval of the scale by using a piece of silver instead of his common thermometer pieces; and in this way he has found out that 130 degrees of Fahrenheit are equal to one of his. He has accordingly, by observing this proportion, continued Fahrenheit's scale to the top of his own. We are now therefore enabled to give a scale of heat from the highest degree of heat produced by an air-furnace to the greatest degree of cold hitherto known, which was produced at Hudson's Bay in December 1784 by a mixture of vitriolic acid and snow. Of the remarkable degrees between these extreme points we shall now lay before our readers a scale.

42
Scale of
heat.

	Fahrenheit's scale.	Wedgwood's scale.
Extremity of Wedgwood's scale	32277°	240°
Greatest heat of his small air-furnace	21877	160
Cast iron melts	17977	130
Greatest heat of a common smith's forge	17327	125
Welding heat of iron, greatest	13427	95
least	12777	90
Fine gold melts	5237	32
Fine silver melts	4717	28
Swedish copper melts	4587	27
Brass melts	3807	21
Heat by which his enamel colours are burnt on	1857	6
Red-heat fully visible in day-light	1077	0
Red-heat fully visible in the dark	947	1
MERCURY BOILS, also lintseed and other expressed oils	600	
Oil of turpentine boils	560	
Sulphuric acid boils	546	
Lead melts	540	
Bismuth melts	460	
Tin melts	408	
Sulphur melts	244	
Nitrous acid boils	242	
Cows milk boils	213	
WATER BOILS	212	
Human urine boils	206	
Brandy boils	190	
Alcohol boils	174	
Serum of blood and white of eggs harden	156	
Bees wax melts	142	
Heat of the air near Senegal sometimes	111	
Hens hatch eggs about	108	
Heat of birds from	103 to 111	
Heat of domestic quadrupeds from	100 to 103	
Heat of the human body	92 to 99	
Heat of a swarm of bees	97	
Heat of the ocean under the equator	80	
Butter melts	74	
Vitriolic acid of the specific gravity of 1780 freezes at	45	
Oil of olives begins to congeal	43	
Heat of hedgehogs and marmots in a torpid state	39½	
WATER FREEZES and snow melts	32	
Milk freezes	30	
Urine and common vinegar freezes	28	
Human blood freezes	25	
Strong wines freeze	20	

Fahrenheit's scale,

Thermopyle

Thebes.

A mixture of one part of alcohol and three parts of water freezes

7

A mixture of snow and salt freezes

0 to 4

Brandy, or a mixture of equal parts of alcohol and water, freezes

- 7

Spirit of wine in Reaumur's thermometer

froze at Torneo

- 34

MERCURY FREEZES

- 39 or 40

Cold produced by Mr Macnab at Hudson's Bay by a mixture of vitriolic acid and snow

- 69

THERMOPYLÆ, (anc. geog.); a narrow pass or defile, between the wash of the Sinus Maliacus; on the east and steep mountains, reaching to Oeta, made dreadful by unpassable woods; on the west, leading from Thessaly to Locris and Bœotia. These mountains divide Greece in the middle, in the same manner as the Apennine does Italy; forming one continued ridge from Leucate on the west to the sea on the east, with thickets and rocks interspersed; that persons even prepared for travelling, much less an army encumbered with baggage, cannot easily find a commodious passage. In the valley verging towards the Sinus Maliacus, the road is only sixty paces broad; the only military way for an army to pass, if not obstructed by an enemy; and therefore the place is called *Pylæ*, and by others, on account of its hot water, *Thermopylae*. Ennobled by the brave stand made by Leonidas and three hundred Spartans against the whole army of Persia; and by the bold resolution of blind Euthycus, choosing rather to fall there in fight, than return to Sparta, and escape the common danger. Famous also for the Amphyctiones, the common council or states general of Greece, assembling there twice a year, spring and autumn. For an account of the battle of Thermopylæ at which Leonidas with a handful of men engaged the Persian army, see SPARTA.

THESEA, in antiquity, feasts celebrated by the Athenians in honour of Theseus, consisting of sports and games, with mirth and banquets; such as were poor and unable to contribute to them were entertained at the public expence.

THESEUS, a famous hero of antiquity ranked among the demi-gods, whose history is fabulous. He was the reputed son of Ægeus king of Athens. He threw Sciron, a cruel robber, down a precipice; fastened Procrustes tyrant of Attica to a bending pine, which being let loose tore him asunder; killed the Minotaur kept in the labyrinth by king Minos, in Crete; and by the assistance of that prince's daughter, Ariadne, who gave him a clue, escaped out of that labyrinth, and sailed with his deliverer to the isle of Naxos, where he had the ingratitude to leave her.

Theseus afterwards overcame the Centaurs, subdued the Thebans, and defeated the Amazons. He assisted his friend Pirithous in his expedition to the infernal regions to carry off Proserpine; but was imprisoned by Pluto, till he was released by Hercules. He is also said to have established the Isthmean games, in honour of Neptune; to have united the twelve cities of Attica; and to have founded a republic there, 1236 B. C. Some time after, taking a voyage into Epirus, he was seized by Aidonius king of the Molossians; meanwhile Menestheus rendered himself master of Athens. But at length Theseus being released from prison, retired to Scyros, where king Lycomedes caused him to be thrown from the top of a rock. Theseus had several wives; the first of whom was Helena the daughter of Tyndarus; the second, Hypolita queen of the Amazons; and the last, Phedra sister to Ariadne, who punished him for

Fig. 1.

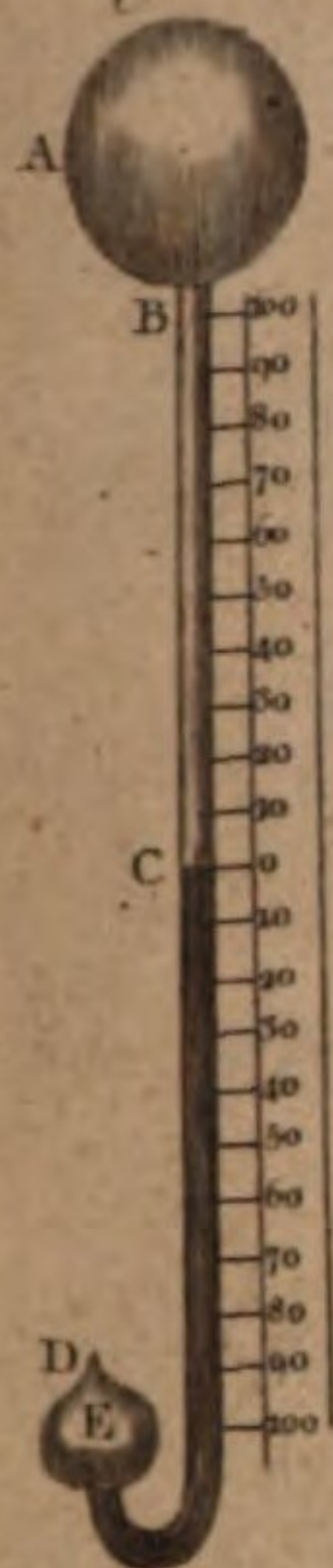


Fig. 2.

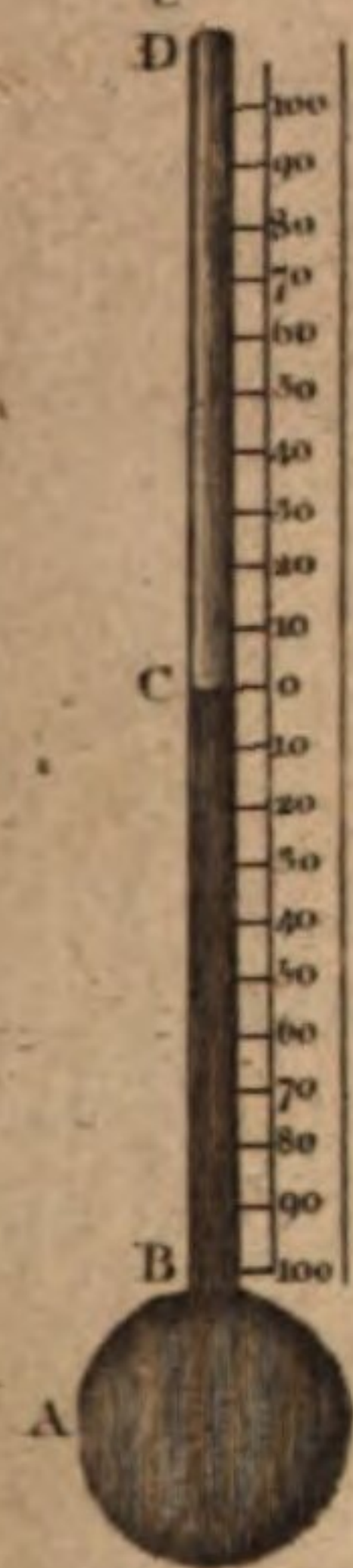


Fig. 3.

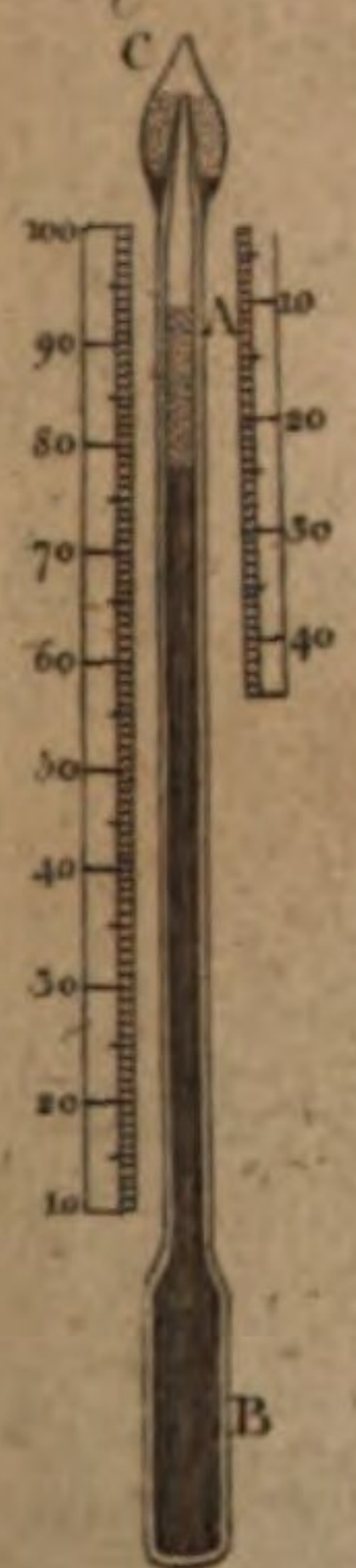


Fig. 4.



Fig. 7.

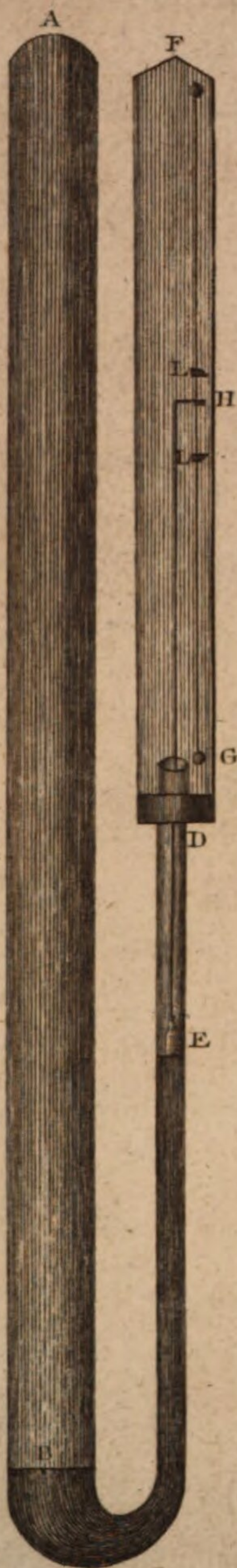


Fig. 8.



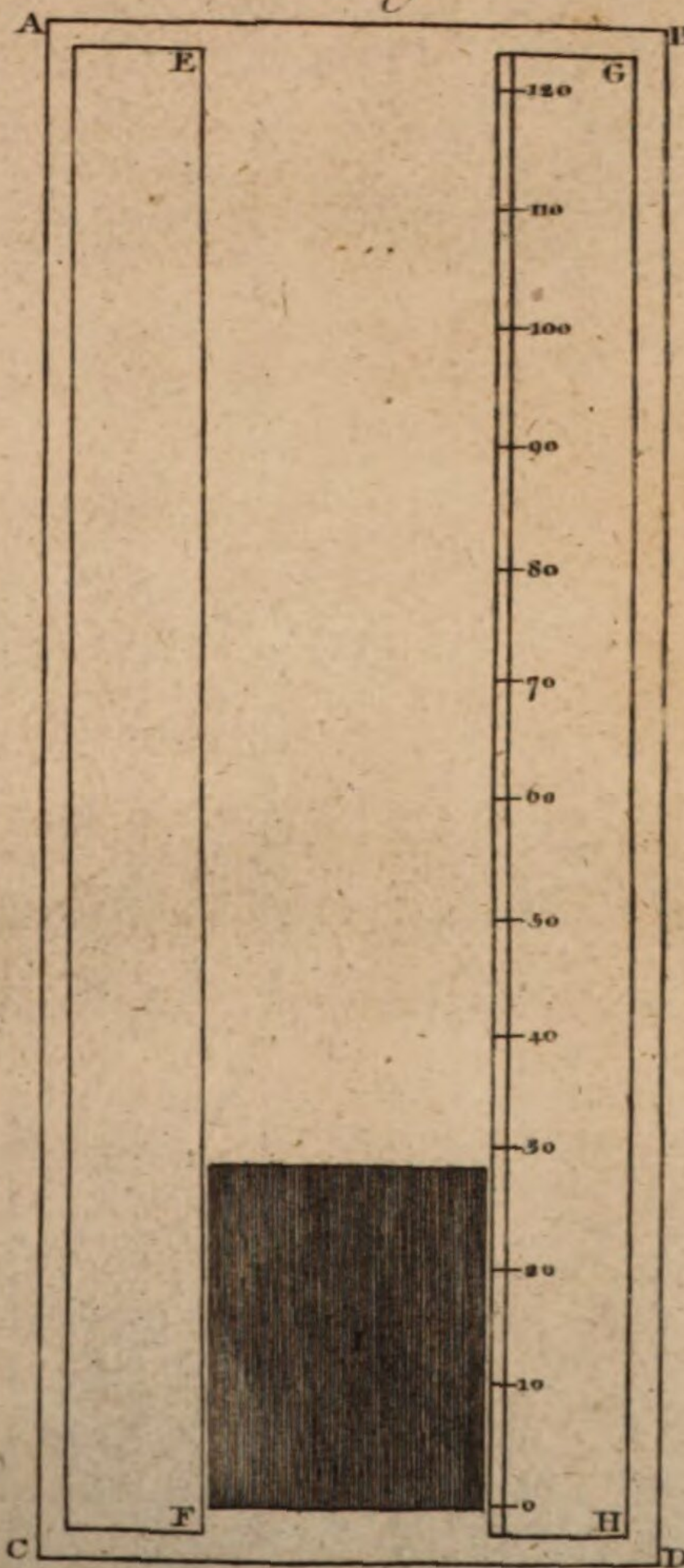
Fig. 5.



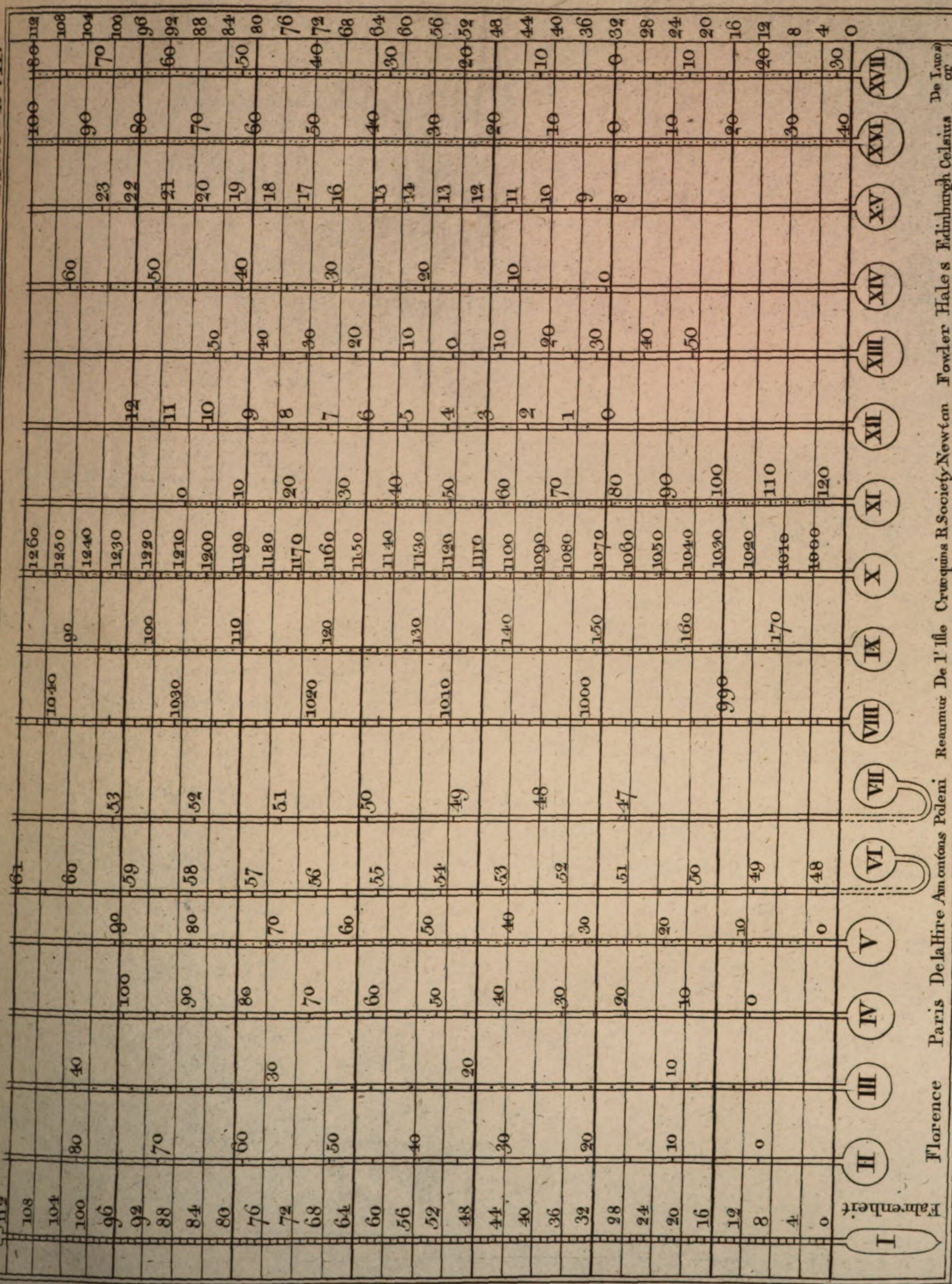
Fig. 6.



Fig. 9.

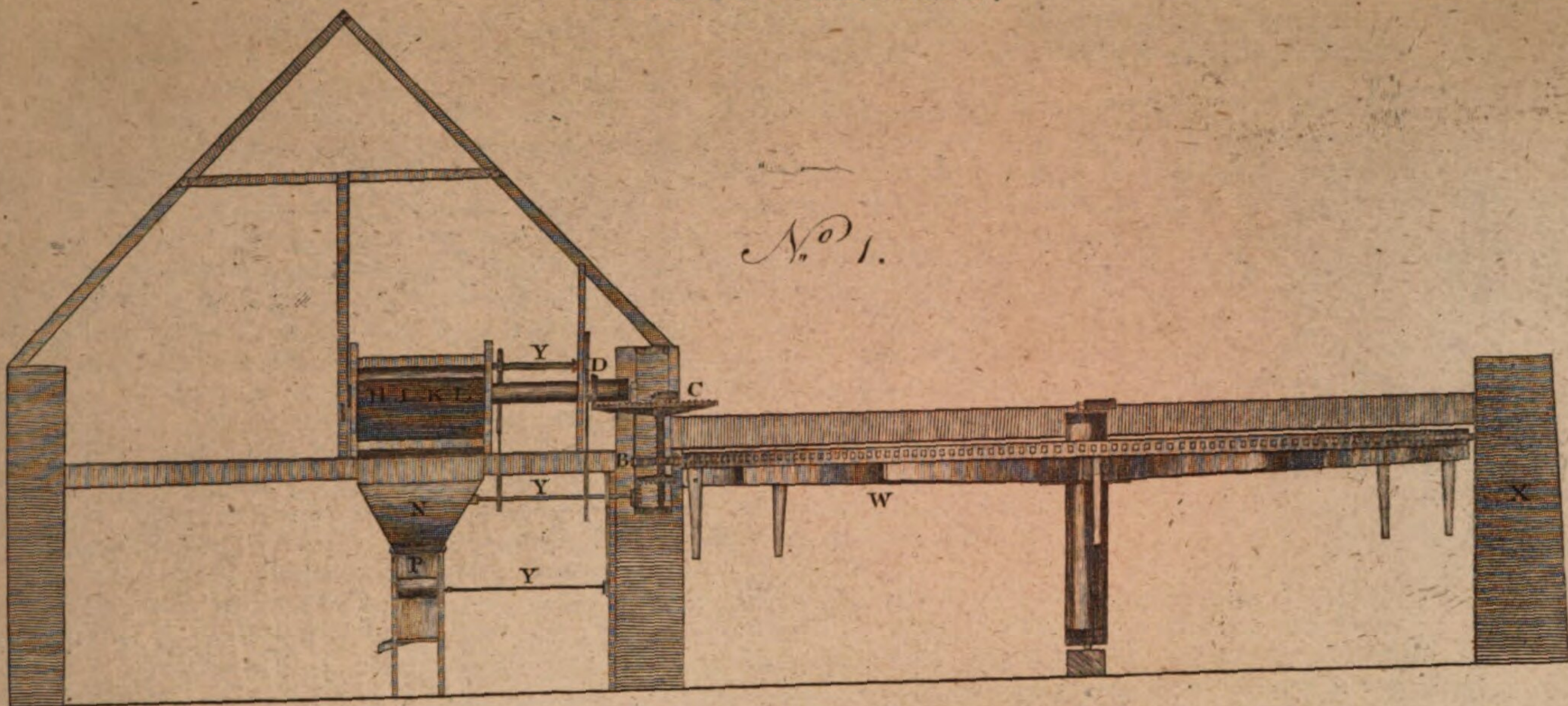


J. Bell Pin. & al. Sculptor fecit.

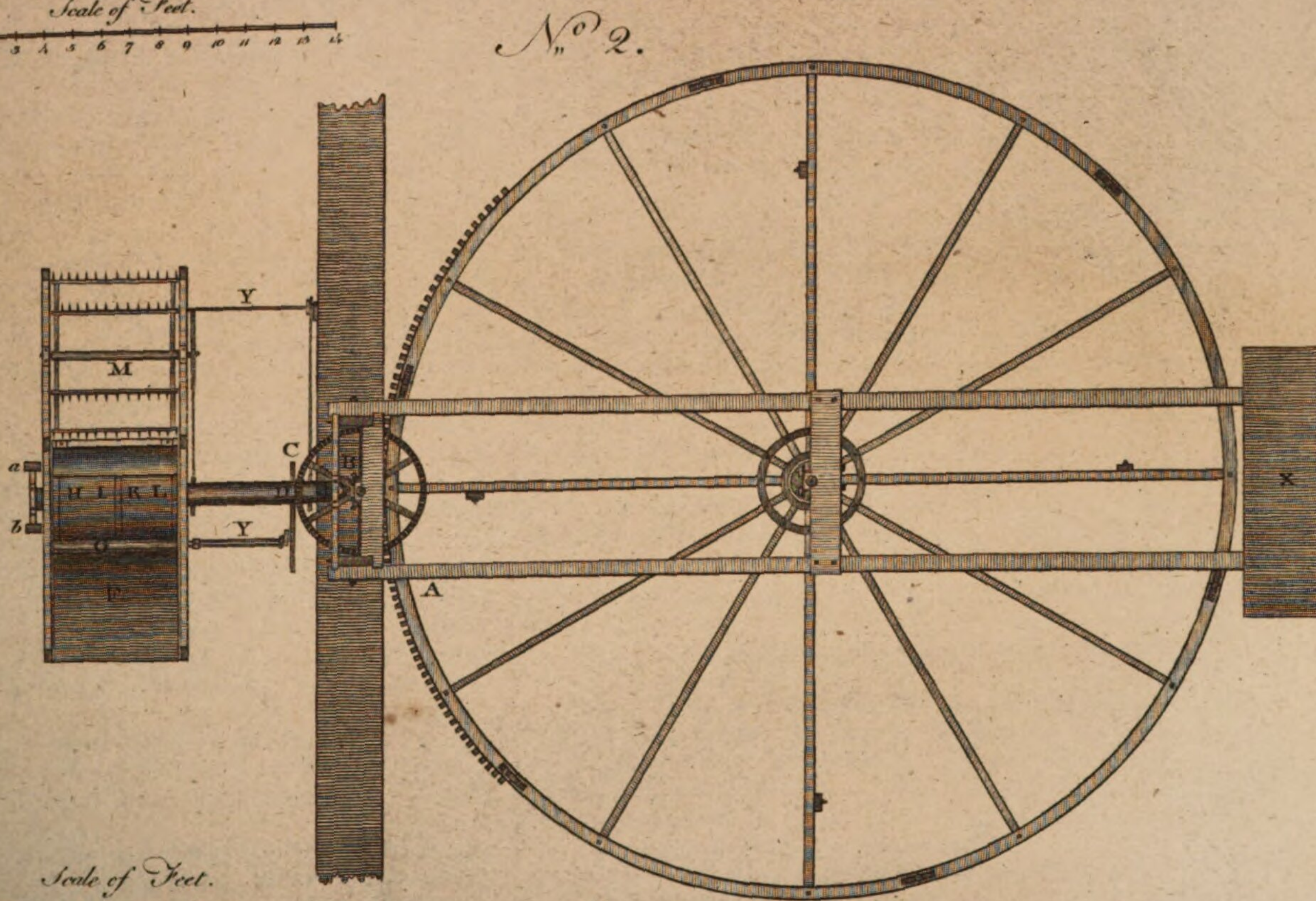


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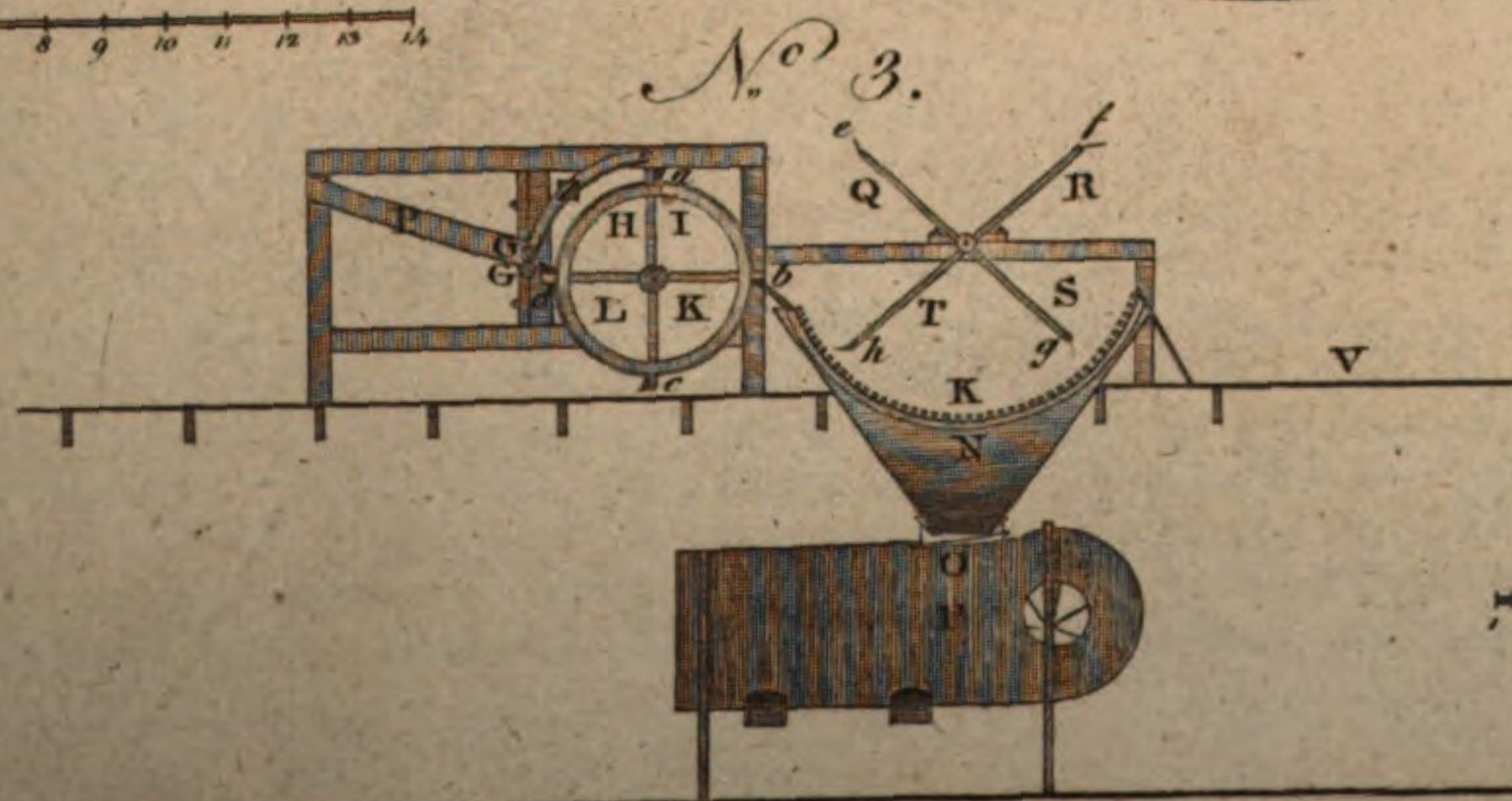
A. Bell, Print. M.D.C.C.C.



Scale of Feet.



Scale of Feet.



Scale of Feet.

Thesis
||
Thetis.

for his infidelity to her sister, by her incestuous passion for his son Hippolitus.

THESIS, a general position which a person advances, and offers to maintain. In taking degrees in universities, the candidates are generally obliged to write a thesis, which they must afterwards defend.

THESIUM, BASE FLUELLIN, in botany; a genus of plants belonging to the class of *pentandria*, and order of *monogynia*. The calyx is monophyllous, with the stamina inserted into it: there is only one seed, which is inferior. There are 17 species; one of which is a British plant, the *linophyllum* or bastard toad-flax. It has a foliaceous panicle with linear leaves, and flowers in June and July.

THESPIA, a famous Greek tragic poet, and the first representer of tragedy at Athens. He carried his troop from village to village in a waggon, from which they performed their pieces. *Alceſtis* was the first tragedy they performed at Athens, 536 B. C. See THEATRE.

Lib. de
Art.

THESSALIAN Chair, so called from Thessaly, where chairs of this figure were most in use; it is recommended by Hippocrates* in place of a machine for reducing a recent luxation of the shoulder bone. The back of this chair is perpendicular to the seat, as Galen tells us; by which construction it is distinguished and accommodated to the operation.

Lempriere's
Dictionary.

THESSALY, a country of Greece, whose boundaries have been different at different periods. Properly speaking, Thessaly was bounded on the south by the southern parts of Greece, or Græcia Propria; east, by the Ægean; north, by Macedonia and Mygdonia; and west, by Illyricum and Epirus. It was generally divided into four separate provinces, Thessaliotis, Pelasgiotis, Isthæotis, and Phthiotis, to which some add Magnesia. It has been severally called *Æmonia*, *Pelasgicum*, *Argos*, *Hellas*, *Argeia*, *Dryopis*, *Pelasgia*, *Pyrrhæa*, &c. The name of Thessaly is derived from Thessalus, one of its monarchs. Thessaly is famous for a deluge which happened there in the age of Deucalion. Its mountains and cities are also celebrated, such as Olympus, Pelion, Oſſia, Larissa, &c. The Argonauts were partly natives of Thessaly. The inhabitants of the country passed for a treacherous nation, so that false money was called *Thessalian coin*, and a perfidious action a *Thessalian deceit*. Thessaly was originally governed by kings, till it became subject to the Macedonian monarchs. The cavalry was universally esteemed, and the people were superstitious and addicted to the study of magic and incantations. See *Lucan*. 6. v. 438, &c.; *Dionys*. 249; *Curt*. 3. c. 2; *Ælian*, V. H. 3. c. 1; *Paus*. 4. c. 36. l. 10. c. 1; *Mela*. 2. c. 3; *Justin* 7. c. 6; *Diod*. 4.

Thessaly is now called *Janna*, a province of European Turkey, bounded by Macedonia on the north, by the Archipelago on the east, by Achaia or Livadia on the south, and by Epirus on the west.

THETIS, in Pagan mythology, the wife of Oceanus, and the mother of Nereus and Doris, who were married to each other; and from this marriage sprung the nymphs of the earth and sea. Among the sea nymphs there was one named *Thetis the Younger*, who excelled all the rest in beauty, and for whom Jupiter conceived such a passion, that he resolved to espouse her: but being informed by the Destinies that she would bring forth a son who would rise above his father, he married her to Peleus. To their nuptials all the gods and goddesses were invited except Discord, who, to be revenged for this contempt, threw a golden apple into the assembly, on which was engraven, *For the fairest*. Juno, Pallas, and Venus, disputed for this apple; but Paris being chosen to decide the difference, adjudged it to Venus. From this marriage of Thetis and Peleus sprung Achilles.

THEURGY, *θεουργία*, a name which the ancients gave to that sacred part of magic which we sometimes call *white magic*, or the *white art*.

The word is formed from *θεός*, "God," and *εργον* "work;" *q. d.* the art of doing divine things, or things which God alone can do: or the power of working extraordinary and supernatural things, by invoking the names of God, saints, angels, &c. Accordingly, those who have written of magic in general, divide it into three parts: the first whereof is called *theurgy*, as operating by divine or celestial means; the second, *natural magic*, performed by the powers of nature; and the third, comprehending *necromancy*, *forcery*, and *witchcraft* or *magic*, performed by the assistance of demons or departed men. See MAGIC.

THIBET. See TIBET.

THIGH, in anatomy. See ANATOMY, n° 58.

THINKING, a general name for any act or operation of the mind. See METAPHYSICS.

THIRLAGE. See LAW, n° clxx. 12—18.

THIRST, an uneasy sensation arising from a deficiency of the saliva to moisten the inward parts of the mouth. Hence arises a strong desire for drink; and thirst is a symptom generally attending fevers of all kinds.—Thirst is best allayed by acids; water kept a while in the mouth, then spit out, and repeated as required; a bit of bread chewed with a little water, which latter may be gradually swallowed; if the person is very hot, brandy is the best for holding in the mouth, but should be spit out again: except in fevers, large draughts of cold water are hurtful.

Preservation against Hunger and THIRST. See HUNGER.

THISTLE, a well known weed in corn-fields. In Britain there are eight species of thistles according to the vulgar arrangement; the *carduus lanceolatus* or spear-thistle, the *nutans* or musk-thistle, the *palustris* or marsh thistle, the *marianus* or milk-thistle, *acanthoides* or wetted-thistle, *crispus* or curled thistle, *onopordum acanthium* or cotton-thistle, *ferratula arvensis* or corn-thistle. All these, except the last, are annual or biennial, and therefore may be easily destroyed by cutting them down before their seed ripens; but the *ferratula arvensis* is perennial, continues in the earth increasing and throwing up new shoots every year. Mr Curtis ascertained the annual increase of its root, by planting in a garden a piece of the root two inches long and about the thickness of a goose's quill, and a small head of leaves. By the 2d of November the root had extended itself eight feet, and when dug and washed it weighed four pounds.

As to the uses of the thistle, they are not well known. The corn-thistle is eaten by the ass, and formerly was pulled with great care by the farmers in some parts of Scotland as food for their horses. For a botanical description of the different kinds of thistle, see *CARDUUS*, *CACTUS*, *DIPSAUS*, *ONOPORDUM*, *SERRATULA*, *SONCHUS*.

Order of the Thistle, or of *St Andrew*, a military order of knighthood in Scotland, the rise and institution of which is variously related by different authors. Lesley bishop of Rots reports, that the night before the battle between Athelstan king of Northumberland and Hungus king of the Picts, a bright cross, in form of that whereon St Andrew (the tutelar saint of Scotland) suffered martyrdom, appeared to Hungus; who having gained the victory, ever after bore the figure of that cross on his banners. Others assert, that Achaius king of Scotland first instituted this order, after having made the famous league offensive and defensive with Charlemagne king of France. But although the thistle had been acknowledged as the symbol of the kingdom of Scotland from the reign of Achaius; yet some

Theurgy.
||
Thistle.

Thlapfi
||
Thomas.

some refer the beginning of this order to Charles VII. of France. Others place the foundation of it as low as the year 1500.

The chief and principal ensign is a gold collar composed of thistles and sprigs of rue interlinked with amulets of gold, having pendent thereto the image of St Andrew with his cross, and the motto, NEMO ME IMPUNE LACESET. "No body shall provoke me with impunity."

The ordinary or common ensign worn by the knights is a star of four silver points, and over them a green circle, bordered and lettered with gold, containing the said motto, and in the centre is a thistle; all which is embroidered on their left breast, and worn with the collar, with a green riband over the left shoulder, and brought under the right arm; pendent thereto is the image of St Andrew, with his cross, in a purple robe, within an oval of gold enamelled vert, with the former motto; but sometimes they wear, encircled in the same manner, a thistle crowned.

About the time of the Reformation, this order was dropped, till James II. of Great Britain resumed it, by creating eight knights. The Revolution unsettled it again; and it lay neglected, till queen Anne, in 1703, restored it to the primitive design, of twelve knights of St Andrew.

THLAPSI, BASTARD-CRESS, or *mithridate-mustard*, in botany: A genus of plants belonging to the class of *tetradynamia*, and order of *siliculosa*; and in the natural system ranging under the 39th order, *Siliquosa*. The pod is emarginated, obcordate, and polyspermous; the valves are boat-shaped and marginato-carinated. There are 12 species; of which six only are natives of Britain, the *arvense*, *hirtum*, *campestre*, *montanum*, *perfoliatum*, and *burfa pastoris*.

1. The *arvense*, treacle-mustard or penny-cress, has orbiculate pods, and leaves oblong, smooth, and scalloped. It smells like garlic, and has a white flower. 2. The *hirtum*, or perennial mithridate-mustard, has roundish hairy pods; the cauline leaves are sagittate and villous. 3. The *campestre*, or mithridate-mustard, has roundish pods, sagittate leaves, dentated and hairy. 4. *Montanum*, or mountain mithridate-mustard, has obcordate pods, smooth leaves; the radical leaves somewhat fleshy, obovate and entire; the cauline embracing the stalk, and the corolla being larger than the calyx. 5. The *perfoliatum*, or perfoliate treacle-mustard, has obcordate pods; the cauline leaves are smooth and subdentate; the petals of the length of the calyx, and the stalk branchy. 6. The *burfa pastoris*, or shepherd's purse, has obcordate pods; the radical leaves are pinnatifid.

The seeds of some of these species have an acrid biting taste, approaching to that of the common mustard; with which they agree nearly in their pharmaceutic properties. They are rarely made use of any otherwise than as ingredients in the compositions whose names they bear; though some recommend them in different disorders, preferably to the common mustard.

THOLOUSE. See TOULOUSE.

THOMÆANS, THOMISTS. See CHRISTIANS of St Thomas.

THOMAS AQUINAS. See AQUINAS.

St THOMAS's Day, a festival of the Christian church, observed on December 21. in commemoration of St Thomas the apostle.

St THOMAS of Canterbury's Day, a festival of the Roman church, observed on December 29. in memory of Tho-

mas Becket archbishop of Canterbury, who was murdered, or, as the Romanists say, martyred, in the reign of king Henry II.

THOMAS the Reymour, called also *Thomas Lermont*, and *Thomas of Erceldon*, was born at Erceldon, a village near Melrose in Tweedale, in what year is uncertain; but he was an old man when Edward I. was carrying on war in Scotland.

The character of Lermont as a prophet, and which was common to him with Linus, Orpheus, and other early poets in many countries, arose, if we may believe Mackenzie in his *Lives of Scottish Writers*, from his having conferences with Eliza, a nun and prophetess at Haddington. Lermont put her predictions into verse, and thus came in for his share of the prophetic spirit. None of these ancient prophecies now remain; but the following, which pretends to be one of them, is given from a manuscript of the time of Edward I. or II. The countess of Dunbar is the lady famous for the defence of her castle against the English. Her proper title was *Countess of March*; but it was common in these times to style a nobleman from his chief residence. Thus Gilbert Strongbow, earl of Pembroke, is called *Earl of Striguil*, from his residence at Striguil castle, near Chepstow, Monmouthshire, &c.

La Countesse de Donbar demande a Thomas de Effedoune, quant la guere d'Escoce prendreit fyn. E yl l'a repoundy, et dyt.

When man as mad a kyng of a capped mon.
When mon is levere oter mons thyng than is owen.
When londe thouys forest, and forest ys felde.
When hares kendles othe herston.
When Wyt and Wille werres togedere.
When mon makes stables of kyrkes; and steles castles wyth styes.
When Rokebourh nys no burgh; ant market is at Forwyleye.
When the alde is gan, and the newe is come that doue noht.
When Bambourne ys donged with dede men.
When men ledes men in ropes to buyen ant to sellen.
When a quarter of waty whete is chaunged for a colt of ten markes.
When prude prikes, ant pees is leyd in prisoun.
When a Scot ne may hym hude ase hare in forme, that the Englysh ne shal hym fynde.
When ryht ant wrong astente the togedere.
When laddes weddeth lovedies.
When Scottes fien so faste, that for faute of ship, hy drouneth hemselve.
When shal this be?
Nouthur in thine tyme, ne in myne.
Ah comen, ant gone,
Withinne twenty wynter ant on.

In fact, the prophecies of Lermont appear to have been merely traditional; nay, it seems doubtful if he ever pretended to such folly, notwithstanding Mackenzie's story of Eliza. The reverence of the people for a learned and respectable character seems to have been the sole foundation of Thomas's claim to prophecy. But, in the 16th century, prophecies were made, and ascribed to him, as well as others given to Bede, Merlin, &c. (A). They were printed at Edinburgh, 1615, reprinted 1680, and 1742.

THOMISM. See AQUINAS.

THOMSON

(A) Sibilla and Banister Anglicus are mentioned in the time of Edward IV. (MSS Cot. Dom. A. IX.) A long Latin prophecy of Bridlington is there given. Waldhave and Eltraine seem also English prophets. In the whole collection, therefore, Thomas is the only Scottish one.

Thomson.

THOMSON (James), an excellent British poet, the son of a Scotch divine, was born in the shire of Roxburgh in 1700, and was educated in the university of Edinburgh with a view to the ministry. But his genius inclining him to the study of poetry, which he soon found would be incompatible with that of theology, or at least might prevent his being provided for in that way in his own country, he relinquished his views of engaging in the sacred function, and repaired to London in consequence of some encouragement which he had received from a lady of quality there, a friend of his mother.

The reception he met with wherever he was introduced, emboldened him to risk the publication of his excellent poem on Winter.—This piece was published in 1726; and from the universal applause it met with, Mr Thomson's acquaintance was courted by people of the first taste and fashion. But the chief advantage which it procured him was the acquaintance of Dr Rundle, afterward bishop of Derry, who introduced him to the late lord chancellor Talbot; and some years after, when the eldest son of that nobleman was to make his tour on the continent, Mr Thomson was chosen as a proper companion for him. The expectations which his Winter had raised, were fully satisfied by the successive publications of the other seasons; of Summer, in the year 1727; of Spring, in the following year; and of Autumn, in a quarto edition of his works, in 1730. Beside the Seasons, and his tragedy of Sophonisba, written and acted with applause in the year 1729, he had, in 1727, published his poem to the memory of Sir Isaac Newton, with an account of his chief discoveries; in which he was assisted by his friend Mr Gray, a gentleman well versed in the Newtonian philosophy. That same year the resentment of our merchants, for the interruption of their trade by the Spaniards in America, running very high, Mr Thomson zealously took part in it, and wrote his *Britannia*, to rouse the nation to revenge.

With the Honourable Charles Talbot, our author visited most of the courts in Europe, and returned with his views greatly enlarged; not only of exterior nature and the works of art, but of human life and manners, and of the constitution and policy of the several states, their connections, and their religious institutions. How particular and judicious his observations were, we see in his poem on Liberty, begun soon after his return to England. We see at the same time to what a high pitch his care of his country was raised, by the comparisons he had all along been making of our happy government with those of other nations. To inspire his fellow-subjects with the like sentiments, and show them by what means the precious freedom we enjoy may be preserved, and how it may be abused or lost, he employed two years in composing that noble work, upon which he valued himself more than upon all his other writings. On his return to England with Mr Talbot (who soon after died), the chancellor made him his secretary of briefs; a place of little attendance, suiting his retired indolent way of life, and equal to all his wants. From this office he was removed, when death, not long after, deprived him of his noble patron. He then found himself reduced to a state of precarious dependence. In this situation, having created some few debts, and his creditors finding that he had no longer any certain support, became inexorable; and imagined by confinement to force that from his friends, which his modesty would not permit him to ask. One of these occasions furnished Quin, the celebrated actor, with an opportunity of displaying the natural goodness of his heart, and the disinterestedness of his friendship. Hearing that Thomson was confined in a spunging house for a debt of about 70*l.* he repaired to the place; and, having inquired

Thomson.

for him, was introduced to the bard. Thomson was a good deal disconcerted at seeing Quin, as he had always taken pains to conceal his wants; and the more so, as Quin told him he was come to sup with him. His anxiety upon this head was however removed, upon Quin's informing him, that, as he supposed it would have been inconvenient to have had the supper dressed in the place they were in, he had ordered it from an adjacent tavern; and, as a prelude, half a dozen of claret was introduced. Supper being over, and the bottle circulating pretty briskly, Quin said, "It is time now we should balance accounts." This astonished Thomson, who imagined he had some demand upon him; but Quin perceiving it, continued, "Mr Thomson, the pleasure I have had in perusing your works I cannot estimate at less than a hundred pounds, and I insist upon now acquitting the debt." On saying this, he put down a note of that value, and took his leave, without waiting for a reply.

The profits arising from his works were not inconsiderable; his tragedy of *Agamemnon*, acted in 1738, yielded a good sum. But his chief dependence was upon the prince of Wales, who settled on him a handsome allowance, and honoured him with many marks of particular favour. Notwithstanding this, however, he was refused a licence for his tragedy of *Edward and Eleanor*, which he had prepared for the stage in the year 1736, for some political reasons. Mr Thomson's next performance was the *Masque of Alfred*, written in the year 1740 jointly with Mr Mallet; by the command of the prince of Wales, for the entertainment of his royal highness's court at Clifden, his summer residence.

Mr Thomson's poem, entitled the *Castle of Indolence*, was his last work published by himself; his tragedy of *Coriolanus* being only prepared for the theatre, when a fatal accident robbed the world of one of the best of men and best of poets. He would commonly walk the distance between London and Richmond (where he lived) with any acquaintance that offered, with whom he might chat and rest himself, or perhaps dine by the way. One summer evening being alone in his walk from town to Hammersmith, he had over-heated himself, and in that condition imprudently took a boat to carry him to Kew; apprehending no bad consequence from the chill air on the river, which his walk to his house, towards the upper end of Kew-lane, had always hitherto prevented. But now the cold had so seized him, that the next day he was in a high fever. This, however, by the use of proper medicines, was removed, so that he was thought out of danger; till the fine weather having tempted him to expose himself once more to the evening dews, his fever returned with violence, and with such symptoms as left no hopes of a cure. His death happened on the 27th of August 1748.

Mr Thomson had improved his taste upon the finest originals, ancient and modern. The autumn was his favourite season for poetical composition, and the deep silence of the night he commonly chose for his studies. The amusement of his leisure-hours were civil and natural history, voyages, and the best relations of travellers. Though he performed on no instrument, he was passionately fond of music, and would sometimes listen a full hour at his window to the nightingales in Richmond gardens; nor was his taste less exquisite in the arts of painting, sculpture, and architecture. As for the more distinguishing qualities of his mind and heart, they best appear in his writings. There his devotion to the Supreme Being, his love of mankind, of his country, and friends, shine out in every page; his tenderness of heart was so unbounded, that it took in even the brute creation. It is not known, that through his whole life he ever gave any person a moment's pain, either by his writings.

Thomson
||
Thornhill.

writings or otherwise. He took no part in the political squabbles of his time, and was therefore respected and left undisturbed by both sides. These amiable virtues did not fail of their due reward; the applause of the public attended all his productions, and his friends loved him with an enthusiastic ardour.

Johnson's
Lives of the
Poets.

"As a writer (says Dr Johnson), he is intitled to one praise of the highest kind; his mode of thinking, and of expressing his thoughts, is original. His blank verse is no more the blank verse of Milton, or of any other poet, than the rhymes of Prior are the rhymes of Cowley. His numbers, his pauses, his diction, are of his own growth, without transcription, without imitation. He thinks in a peculiar train, and he thinks always as a man of genius; he looks round on Nature and on life with the eye which Nature bestows only on a poet; the eye that distinguishes, in every thing presented to its view, whatever there is on which imagination can delight to be detained, and with a mind that at once comprehends the vast, and attends to the minute. The reader of the Seasons wonders that he never saw before what Thomson shews him, and that he never yet has felt what Thomson impresses."

His testamentary executors were the lord Lyttelton, whose care of our poet's fortune and fame ceased not with his life; and Mr Mitchell, a gentleman equally noted for the truth and constancy of his private friendship, and for his address and spirit as a public minister. By their united interests, the orphan play of *Coriolanus* was brought on the stage to the best advantage; from the profits of which, and the sale of manuscripts and other effects, a handsome sum was remitted to his sisters. His remains were deposited in the church of Richmond, under a plain stone, without any inscription. A handsome monument was erected to him in Westminster abbey in the year 1762, the charge of which was defrayed by the profits arising from a splendid edition of all his works in 4to; Mr Millar the bookseller, who had purchased all Mr Thomson's copies, giving up his property on this grateful occasion. A monument has also been erected to him at the place of his birth.

Henry's Hi-
story of
Great Bri-
tain, vol. ii.
part 4.

THOR, the eldest and bravest of the sons of Odin and Frea, was, after his parents, the greatest god of the Saxons and Danes while they continued heathens. They believed, that Thor reigned over all the aerial regions, which composed his immense palace, consisting of 540 halls; that he launched the thunder, pointed the lightening, and directed the meteors, winds, and storms. To him they addressed their prayers for favourable winds, refreshing rains, and fruitful seasons; and to him the fifth day of the week, which still bears his name, was consecrated.

THORAX. See ANATOMY.

WHITE or HAW THORN. See CRATÆGUS.

THORN, a town of Poland, in Regal Prussia, and in the palatinate of Culm. It was formerly a Hanseatic town, and still enjoys great privileges; is large and well fortified; but part of the fortifications, and a great number of houses, were ruined by the Swedes in 1703. It is seated on the Vistula, and contains 10,000 inhabitants. E. Long. 18. 42. N. Lat. 53. 6.

THORNBACKE, in ichthyology. See RAIA.

Dictionary
of Painters.

THORNHILL (Sir James), an eminent English painter, was born in Dorsetshire in 1676, of an ancient family; but was constrained to apply to some profession by the distresses of his father, who had been reduced to the necessity of selling his family-estate. His inclination directed him to the art of painting; and on his arrival at London he applied to his uncle, the famous Dr Sydenham, who enabled him to proceed in the study of the art under the direction of a painter who was not very eminent. However, the genius

of Thornhill made ample amends for the insufficiency of his instructor, and by an happy application of his talents he made so great a progress, that he gradually rose to the highest reputation.

Thorough
||
Thrace.

His genius was well adapted to historical and allegorical compositions; he possessed a fertile and fine invention; and he sketched his thoughts with great ease, freedom, and spirit. He excelled also equally in portrait, perspective, and architecture; shewed an excellent taste for design, and had a free and firm pencil. Had he been so fortunate as to have studied at Rome and Venice, to acquire greater correctness at the one, and a more exact knowledge of the perfection of colouring at the other, no artist among the moderns might perhaps have been his superior. Nevertheless, he was so eminent in many parts of his profession, that he must for ever be ranked among the best painters of his time; and his performances in the dome of St Paul's church at London, in the hospital at Greenwich, and at Hampton-court, are such public proofs of his merit as will convey his name to posterity with great honour.

This painter lived in general esteem; he enriched himself by the excellence of his works; was appointed state-painter to Queen Anne, from whom he received the honour of knighthood; had the singular satisfaction to repurchase his family estate; and was so much distinguished as to be elected one of the members of parliament. He died in 1732.

THOROUGH-WAX, in botany. See BUPLEURUM.

THOTH, or THEUT, (called by the Phœnicians *Taaut*, by the Greeks *Hermes*, and by the Romans *Mercury*), was a Phœnician of very superior talents, and one of the civilizers of mankind. He was prime minister to Osiris, whom, after his death, he deified; and he was himself deified by his countrymen the Egyptians, for the benefits that he had rendered to the human race. See MERCURY, MYTHOLOGY, n° 34, and POLYTHEISM, n° 18.

THOUGHT, a general name for all the ideas consequent on the operations of the mind, and even on the operations themselves. See METAPHYSICS.

THOUGHT, in composition. See ORATORY, Part I. and II.

THOUINIA, in botany; a genus of plants belonging to the class of *diandria*, and order of *monogynia*. The corolla is quadripetalous; the calyx quadripartite, and the antheræ sessile. There is only one species discovered, the *nutans*.

THRACE, a country very frequently mentioned by the Greek and Latin writers, deriving its name, according to Josephus, from Tiras one of the sons of Japhet. It was bounded on the north by mount Hæmus; on the south, by the Ægean Sea; on the west, by Macedon and the river Strymon; and on the east, by the Euxine Sea, the Hellespont, and the Propontis.—The Thracian Chersonesus is a peninsula inclosed on the south by the Ægean Sea, on the west by the gulf of Melas, and on the east by the Hellespont; being joined on the north to the continent by a neck of land about 37 furlongs broad. The inland parts of Thrace are very cold and barren, the snow lying on the mountains the greatest part of the year; but the maritime provinces are productive of all sorts of grain and necessaries for life; and withal so pleasant, that Mela compares them to the most fruitful and agreeable countries of Asia.

The ancient Thracians were deemed a brave and warlike nation, but of a cruel and savage temper; being, according to the Greek writers, strangers to all humanity and good nature. It was to the Thracians, however, that the Greeks were chiefly indebted for the polite arts that flourished among them; for Orpheus, Linus, Musæus, Thamyras, and Eumolpus, all Thracians, were the first, as Eustathius informs us, who charmed the inhabitants of Greece with their eloquence.

eloquence and melody, and persuaded them to exchange their fierceness for a sociable life and peaceful manners; nay, great part of Greece was anciently peopled by Thracians. Tereus, a Thracian, governed at Daulis in Phocis, where the tragical story of Philomela and Progne was acted. From thence a body of Thracians passed over to Eubœa, and possessed themselves of that island. Of the same nation were the Aones, Tembices, and Hyanthians, who made themselves masters of Bœotia; and great part of Attica itself was inhabited by Thracians, under the command of the celebrated Eumolpus. It is not therefore without the utmost ingratitude and injustice that the Greeks style them *Barbarians*, since to them chiefly they were indebted both for the peopling and polishing of their country.

Thrace was anciently divided into a number of petty states, which were first subdued by Philip of Macedon. On the decline of the Macedonian empire, the country fell under the power of the Romans. It continued under subjection to them till the irruption of the Turks, in whose hands it still remains.

THRASHING, in agriculture, the operation by which corn is separated from the straw. This operation is performed in a variety of ways, sometimes by the feet of animals, sometimes by a flail, and sometimes by a machine.

The most ancient method of separating the corn from the straw was by the hoofs of cattle or horses. This was practised by the Israelites, as we find from the books of Moses; it was also common among the Greeks and Romans*. Flails and thrashing machines were also not uncommon among these nations†. The flail which was used by the Romans, called *baculus*, *fustis*, or *pertica*, was probably nothing more than a cudgel or pole. The thrashing machine, which was called *tribula* or *tribulum*, and sometimes *traba*, was a kind of sledge made of boards joined together, and loaded with stone or iron. Horses were yoked to this machine, and a man was seated upon it to drive them over the sheaves of corn.

Different methods are employed in different countries for separating the corn from the stalk. In the greatest part of France the flail is used; but in the southern districts it is generally performed by the feet of animals: animals are also used for the same purpose in Spain, in Italy, in the Morea, in the Canaries, in China, and in the vicinity of Canton, where the flail is also sometimes used. It appears that in hot climates the grains do not adhere so firmly to the stalk as in cold countries, and therefore may be more easily separated. This will explain the reason why animals are so frequently employed in hot countries for treading out the corn; whereas in cold climates we know they are seldom tried, and have no reason to suppose that they would answer the purpose. In the Isle of France in Africa, rice and wheat are thrashed with poles, and maize with sticks; for it has not been possible to teach the negroes the use of the flail.

The animals used for treading out corn are, oxen, cows, horses, mules, and even asses when the quantity is not great. The operation is performed in this manner: The sheaves, after being opened, are spread in such a manner that the ears of the corn are laid as much uppermost as possible, and a man, standing in the centre, holds the halters of the cattle, which are made to trot round as in a manege; whilst other men with forks shake the straw up from time to time, and the cattle are trotted over it again and again till they have beaten out all the grain. This method is expeditious enough; but besides bruising a considerable quantity of corn, it requires a great many cattle, and injures the legs of the horses and mules, which are preferred before cows and oxen for this work.

The flail is undoubtedly a much better instrument for

thrashing corn than the feet of animals, for it separates the grain from the straw and husks both more effectually and more expeditiously; yet it is liable to many objections. It is a very laborious employment, too severe indeed even for a strong man; and as it is usually the interest of the thrasher rather to thrash much than to thrash clean, a good deal of corn will generally be left upon the straw. It is therefore an object of great importance in husbandry to procure a proper machine for separating the corn from the straw.

The first thrashing machine attempted in modern times, of which we have received any account, was invented in Edinburgh by Mr Michael Menzies about the year 1732. It consisted of a number of instruments like flails, fixed in a moveable beam, and inclined to it at an angle of ten degrees. On each side of the beam in which the flails were fixed, floors or benches were placed for spreading the sheaves on. The flails were moved backwards and forwards upon the benches by means of a crank fixed on the end of an axle, which made about 30 revolutions in a minute.

The second thrashing machine was invented by Mr Michael Stirling, a farmer in the parish of Dunblane, Perthshire. Of this discovery we have received a very accurate and authentic account from his son, the Reverend Mr Robert Stirling minister of Crieff.

It is an old proverb, that necessity is the mother of invention. This was verified on the present occasion. Besides his ordinary domestic servants, Mr M. Stirling had occasion sometimes to hire an additional number to thrash out his grain, and frequently found it difficult to procure so many as he needed. This naturally led him to reflect whether the operation of thrashing could not easily be performed by machinery. Accordingly, so early as the year 1753, under the pretence of joining in the amusements of his children, he formed in miniature a water mill, in which two iron springs, made to rise and fall alternately, represented the motion of two flails, by which a few stalks of corn put under them might be speedily thrashed. This plan he executed on a scale sufficiently large within two years after, making the springs about ten feet long, each of which had one end firmly screwed into a solid plank, and the other terminated in a round baton of solid iron, two feet long and above an inch in diameter. Under these the sheaves were conveyed gradually forward in a narrow channel or trough, by passing between two indented horizontal cylinders, similar to those now used in most of the thrashing mills in that part of the country, and called *feeders*. In this manner the thrashing was executed completely, and with considerable rapidity; but as the operation was performed on a low floor, and no method contrived for carrying off the straw, the accumulation of it produced such confusion, and the removal of it was attended with such danger, that this scheme was very soon entirely abandoned. The mortification arising from disappointment, and especially the scoffs of his neighbours, for what was universally accounted an absurd and ridiculous attempt, served only to stimulate the exertions of the inventor to accomplish his designs on another plan.

Laying aside therefore the iron springs with the feeders, and all the apparatus adapted to them, he retained only an outer or water wheel, with an inner or cog wheel moving on the same axle; to this inner wheel, which had 48 teeth or cogs, he applied a vertical trundle or pinion, with seven notches, the axle of which passed through a floor above the wheel, and having its upper pivot secured in a beam six feet above that floor. At the distance of three feet three inches above the floor two straight pieces of squared wood, each four feet long, passed through the axle of the trundle at right angles, forming four arms, to be moved round horizontally. To the extremities of these arms were fixed

Threshing. four iron plates, each 20 inches long, and eight broad at the end next the arms, but tapering towards a point at the other end. This large horizontal fly, constituting four thrashers, was inclosed within a wooden cylindrical box three and an half feet high and eight in diameter. On the top of the box was an opening or port (two or three ports were made at first, but one was found sufficient) eight inches wide, and extending from the circumference a foot and an half towards its centre, through which the corn sheaves descended, being first opened and laid one by one on a board with two ledges gently declining towards the port; on which board they were moderately pressed down with a boy's hand, to prevent them from being too hastily drawn in by the repeated strokes of the thrashers. Within the box was an inclined plane, along which the straw and grain fell down into a wide wire riddle two feet square, placed immediately under a hole of nearly the same size. The riddle received a jerk at every revolution of the spindle from a knob placed on the side of it, and was instantly thrust backward by a small spring pressing it in the opposite direction. The short straw, with the grain and chaff which passed through the wide riddle, fell immediately into an oblong strait riddle, which hung with one end raised and the other depressed, and was moved by a contrivance equally simple as the other; and having no ledge at the lower end, the long chaff which could not pass through the riddle dropped from thence to the ground; while the grain and most of the chaff falling through the riddle into a pair of common barn-fanners that stood under it on the ground floor, the strong grain, the weak, and the chaff, were all separated with great exactness. The fanners were moved by a rope or band running circuitously in a shallow niche cut on the circumference of the cog-wheel. The straw collected gradually in the bottom of the box over the wide riddle, and through an opening two and an half feet wide, and as much in height, left in that side of the box nearest the brink of the upper floor, was drawn down to the ground with a rake by the person or persons employed to form it into sheaves or rolls.

Such was the thrashing mill invented by Mr Michael Stirling, which, after various alterations and improvements, he completed in the form now described, A. D. 1758. By experiment it was found that four bolls of oats, Linlithgow measure, could be thrashed by it in 25 minutes. From that period he never used a common flail in thrashing, except for humbling or bearding barley. In every other kind of grain he performed the whole operation of thrashing with the mill; and continued always to use it till 1772, when he retired from business, and his thrashing mill became the property of his second son, who continues to use it with equal advantage and satisfaction. Several machines were constructed on the same plan, particularly one near Stirling, under Mr Stirling's direction, for Mr Moir of Leckie, in 1765, which, we understand, has been used ever since, and gives complete satisfaction to the proprietor. There was another erected in 1778 by Mr Thomas Keir (in the parish of Muthil and county of Perth), who has contrived a method of bearding barley with it: and by the addition of a small spindle with short arms contiguous to the front of the box, and moved by a band common to it and the great spindle to which it is parallel, the straw is shaken and whirled out of the box to the ground. That this machine did not come immediately into general use, was owing partly to the smallness of the farms in that part of the country, whose crops could easily be thrashed by the few hands necessarily retained on them for other purposes; and chiefly to an apprehension that the machine could only be moved by water; an apprehension which experience proves to be entirely groundless. The

machine however, was, ingenious, and did great credit to **Threshing** the worthy inventor, and certainly deserved a better fate than it was destined to undergo.

A third threshing mill was invented in 1772, by two persons nearly about the same time, and upon the same principles. The inventors were, Mr Alderton who lived near Alnwick, and Mr Smart at Wark in Northumberland. The operation was performed by rubbing. The sheaves were carried round between an indented drum of about six feet diameter, and a number of indented rollers arranged round the circumference of the drum, and attached to it by means of springs; so that while the drum revolved, the fluted rollers rubbed the corn off from the straw by rubbing against the flutings of the drum. But as a considerable quantity of the grain was bruised in passing between the rollers, the machine was soon laid aside.

In 1776 an attempt was made by Mr Andrew Meikle, an ingenious millwright in the parish of Tynningham, East Lothian, to construct a new machine upon the principles which had been adopted by Mr Menzies already mentioned. This consisted in making joints in the flails, which Mr Menzies had formed without any. But this machine, after much labour and expence, was soon laid aside, on account of the difficulty of keeping it in repair, and the small quantity of work performed, which did not exceed one boll or six Winchester bushels of barley *per* hour.

Some time after this, Mr Francis Kinloch, then junior of Gilmerton, having visited the machine invented in Northumberland, attempted an improvement upon it. He inclosed the drum in a fluted cover; and instead of making the drum itself fluted, he fixed upon the outside of it four fluted pieces of wood, which by means of springs could be raised a little above the circumference of the drum, so as to press against the fluted covering, and thus rub off the ears of corn as the sheaves passed round between the drum and the fluted covering. But not finding this machine to answer his expectation (for it bruised the grain in the same manner as the Northumberland machine did), he sent it to Mr Meikle, that he might, if possible, rectify its errors.

Mr Meikle, who had long directed his thoughts to this subject, applied himself with much ardour and perseverance to the improvement and correction of this machine; and after spending a good deal of time upon it, found it was constructed upon principles so erroneous, that to improve it was impracticable.

At length, however, Mr Meikle's own genius invented a model, different in principle from the machines which had already been constructed. This model was made in the year 1785; and in the following year the first thrashing machine on the same principles was erected in the neighbourhood of Alloa, in the county of Stirling, by Mr George Meikle the son of the inventor. This machine answered completely the wishes of Mr Stein, the gentleman for whom it was erected, who gave the most ample testimony of his satisfaction both to the inventor and to the public. The fame of this discovery soon spread over the whole country, and a great many farmers immediately applied to Mr Meikle, desiring to have thrashing mills erected on their farms. The discovery, it appeared, would be profitable, and it was reasonable that the inventor should enjoy the profits of his invention. He accordingly applied for a patent; which, after considerable expence, arising from the opposition of some persons, who claimed a share in the discovery, was granted.—These machines are now becoming very common in many parts of Scotland, and are increasing very considerably in number every year over all the united kingdom.

We will now endeavour to describe this machine in its most improved state; which is so simple, that with the assistance

Threshing. *ance of a plate, exhibiting the plan of elevation, n° 1. the ground plan, n° 2. and the 3d showing its essential parts in a distinct manner, we hope it will be easily understood by all our readers who have not had an opportunity of seeing it. The power employed for turning that part of the machine which separates the corn from the straw is produced by four wheels (when moved by horses), the teeth of which move in one another and turn the drum, on which four scutchers are fixed. The sheaves are introduced between two fluted rollers, which hold them firm, and draw them in gradually, while the scutchers strike off the grain from the straw as it passes through. This will suffice for a general idea of this machine. We will now be more particular.*

Plate
DVIII.

The large spur-wheel A, n° 1. and 2. which has 276 cogs, is horizontal, and moves the pinion B, which has 14 teeth. The pinion B moves the crown-wheel C, which has 84 teeth; the wheel C moves a second pinion D, which has 16 teeth; and the pinion D moves the drum HIKL. The drum is a hollow cylinder three feet and an half diameter, and placed horizontally; on the outside of which the scutchers are fixed by strong screw bolts. The scutchers consist of four pieces of wood, faced on one side with a thin plate of iron, placed at an equal distance from each other, and at right angles to the axis of the drum.

The sheaves are spread on an inclined board F, n° 3. from which they are introduced between two fluted rollers GG made of cast iron, about three inches and an half in diameter, and making about 35 revolutions in a minute. As these rollers are only about three quarters of an inch distant from the scutchers or leaves of the drum HIKL, they serve to hold the sheaves fast, while the scutchers *a, b, c, d*, moving with prodigious velocity, separate the grain completely from the straw, and at the same time throw out both grain and straw upon the concave rack M, lying horizontally with slender parallel ribs, so that the corn passes through them into a hopper N placed below. From the hopper it passes through a harp or riddle O into a pair of fanners P, from which, in the most improved machines, it comes out clean and fit for the market. The straw, after being thrown by the scutchers *a, b, c, d*, into the rack, is removed from it by a rake QRST into a place contiguous V. The rake consists of four thin pieces of wood or leaves; on the end of each of these leaves is ranged a row of teeth *e, f, g, h* five inches long. The rake moves in a circular manner in the concave rack, while the teeth catch hold of the straw, and throw it out of the rack. These are all the essential parts of the machine; the rest may be easily understood by the references to the Plate. W is the horse-course, n° 1, which is 27 feet diameter. X is the pillar for supporting the beams on which the axle of the spur-wheel is fixed. YYY are three spindles for moving the two fluted rollers, the rake, and fanners. To the description now given we have only to add, that the drum has a covering of wood Z at a small distance above it, for the purpose of keeping the sheaves close to the scutchers.

The advantages of this machine are many. As the drum makes 300 revolutions in a minute, the four scutchers together make 1200 strokes in the same space of time. From such power and velocity, it is evident that much work must be performed. When the horses go at the rate of two and

one-third miles *per* hour, from three to six bolls will be thrashed; but as the quantity thrashed will be less when the straw is long than when it is short, we shall take the average at four bolls. One gentleman, whose veracity and accuracy we can depend on, assures us, that his mill thrashed 63 bolls in a day; by which, we suppose, he meant 10 hours. To prove the superior advantage of this machine to the common method of thrashing with flails, a gentleman ordered two equal quantities of oats to be thrashed by the mill and by flails. When the corn was cleaned and measured, he obtained $\frac{1}{8}$ th more from the sheaves thrashed by the mill than from those thrashed by the flail. We are also informed by another gentleman who has studied this machine with much attention, and calculated its advantages with care, that, independently of having the corn much cleaner separated from the straw than is usually done by flails, there is a saving of 30 or 40 *per cent.* in the expence of thrashing.

The number of persons requisite for attending the mill when working is six: One person drives the horses; a second hands the sheaves to a third, who unties them, while a fourth spreads them on the inclined boards and presses them gently between the rollers; a fifth person is necessary to riddle the corn as it falls from the fanners, and a sixth to remove the straw (A).

This machine can be moved equally well by water, wind, or horses. Mr Meikle has made such improvements on the wind-mill as to render it much more manageable and convenient than formerly; and we are informed many wind-mills are now erecting in different parts of the country. As to the comparative expence of these different machines, the erection of the horse machine is least; but then the expence of employing horses must be taken into consideration. One of this kind may be erected for L. 70. A water-mill will cost L. 10 more on account of the expence of the water-wheel. A wind-mill will cost from L. 200 to L. 300 Sterling.

THRAVE of CORN, an expression denoting 24 sheaves, or four shocks of six sheaves to the shock; though in some countries they only reckon 12 sheaves to the thrave.

THRASYBULUS, a renowned Athenian general and patriot, the deliverer of his country from the yoke of the 30 tyrants, lived about 294 B. C.*

THRASYMENUS LACUS (anc. geog.), a lake of Etruria, near Perugia, and not far from the Tiber, fatal to the Romans in the Punic war. Now *Il Lago de Perugia* on the Ecclesiastical State.

THREAD, a small line made up of a number of fine fibres of any vegetable or animal substance, such as flax, cotton, or silk; from which it takes its name of linen, cotton, or silk thread.

Dyeing THREAD Black. Linen and cotton thread may be dyed of a durable and deep black by solution of iron in sour beer, in which the linen is to be steeped for some time, and afterwards boiled in madder. See the article DYEING, n° 87.

Thread may be easily bleached by the oxygenated muriatic acid discovered by Mr Scheele. This acid whitens cloth remarkably well, but it is still more advantageous for bleaching thread. M. Welter has formed at Lisle, with two partners, an establishment for bleaching thread with great success, and he has already begun some others. He

3 S 2

has

(A) We add, on the authority of an experienced farmer, that of the six persons necessary to attend the thrashing machine, only two can in justice be charged to the account of the machine; namely, the person who manages the horses, and the one who feeds the machine: For in the usual mode of thrashing by the flail, it requires the same number of persons as the thrashing machine does to clear an equal quantity of corn from the chaff in the same time.

Threshing
||
Thread.

* See Atti-
ca, n° 199
—174.

Threaten-
ing
Thuanus.

has found that 10 or 12 leys and as many immersions are required for some sorts of thread; and that the thread may be surrounded with the liquor, it is necessary to place it, quite loosely, in a basket, which permits the liquor to penetrate to all its surfaces: when the liquor is much weakened, it is still fit to be used for the bleaching of cotton.

Those who wish more information upon the powerful effects of the oxygenated muriatic acid in bleaching, as well as on the cheapest method of preparing it, may consult a Paper written by M. Berthollet, and published in the *Annales de Chimie*, a translation of which is given in the *Repert. of Arts*, vol. i.

THREATENING LETTERS. Knowingly to send any letter without a name, or with a fictitious name, demanding money, or any other valuable thing, or threatening (without any demand) to kill or fire the house of any person, is made felony without benefit of clergy. And sending letters, threatening to accuse any person of a crime punishable with death, transportation, pillory, or other infamous punishment, with a view to extort from him any money or other valuable chattels, is punishable by statute 30 Geo. II. c. 24. at the discretion of the court, with fine, imprisonment, pillory, whipping, or transportation for seven years.

THRESHING. See **THRASHING**.

THRIFT, in botany. See **STATICE**.

THRINAX, small JAMAICA FAN-PALM, in botany; a genus of plants belonging to the natural class of *palmeæ*, and order of *flabellifoliae*. The calyx is sexdentate; there is no corolla; there are six stamina; the stigma is emarginate, and the berry monospermous. This plant was brought from Jamaica to Kew garden by Dr William Wright.

THRIPS, a genus of insects belonging to the order of *hemiptera*. The rostrum is obscure, or so small as to be scarce perceptible. The antennæ are filiform, and as long as the thorax. The body is slender, and of equal thickness in its whole length. The abdomen is reflexible, or bent upwards. The four wings are extended, incumbent upon the back of the insect, narrow in proportion to their length, and cross one another at some distance from their base. The tarsi of the feet are composed of only two articulations.

There are eleven species mentioned by Gmelin; of which three are natives of Britain; the *physapus*, *juneperina*, and *fasciata*.

THROAT, the anterior part of an animal, between the head and the shoulders.

THROAT-WORT. See **CAMPANULA**.

THRONE, a royal seat or chair of state, enriched with ornaments of architecture and sculpture, raised on one or more steps, and covered with a kind of canopy. Such are the thrones in the rooms of audience of kings and other sovereigns.

THROSTLE, in ornithology. See **TURDUS**.

THRUSH, in ornithology. See **TURDUS**.

THRUSH, or *Aphtha*. See **MEDICINE**, n° 233.

THRYALLIS, in botany; a genus of plants belonging to the class of *decandria*, and order of *monogynia*; and in the natural system ranging under the 38th order, *Tricocca*. The calyx is quinquepartite; there are five petals, and the capsule is tricoccus. There is only one species known, the *brasiliensis*.

THUANUS (Jacobus Augustus), youngest son of the president de Thou, was famous for the depth and erudition of his works. He was born in 1553; and having finished his studies and travels, was made president a-Mortier, and took possession thereof in 1595. He was employed in several important offices of state, and in reforming the uni-

versity of Paris; which he discharged with so much prudence, that he was esteemed the Cato of his age, and the ornament of France. He wrote the history of his own time in Latin, from the year 1543 to 1608, in 138 books; a work, both for subject and style, worthy of the ancients. He also left memoirs of his own life, besides poems; and died at Paris, 1617.

THUCYDIDES, a celebrated Greek historian, was born at Athens 471 B. C. He was the son of Olorus, and grandson of Miltiades, who is thought to have been descended from Miltiades the famous Athenian general, and to have married the king of Thrace's daughter. He was educated in a manner suitable to his quality, that is, in the study of philosophy and eloquence. His master in the former was Anaxagoras, in the latter Antiphon; one, by his description in the eighth book of his History, for power of speech almost a miracle, and feared by the people on that account. Suidas and Photius relate, that when Herodotus recited his history in public, a fashion in use then and many ages after, Thucydides felt so great a sting of emulation, that it drew tears from him; inasmuch that Herodotus himself took notice of it, and congratulated his father on having a son who showed so wonderful an affection to the Muses. Herodotus was then 29 years of age, Thucydides about 16.

When the Peloponesian war began to break out, Thucydides conjectured truly, that it would prove a subject worthy of his labour; and it no sooner commenced than he began to keep a journal. This explains the reason why he has attended more to chronological order than to unity of design. During the same war he was commissioned by his countrymen to relieve Amphipolis; but the quick march of Brasidas the Lacedæmonian general defeated his operations; and Thucydides, unsuccessful in his expedition, was banished from Athens. This happened in the eighth year of this celebrated war; and in the place of his banishment the general began to write an impartial history of the important events which had happened during his administration, and which still continued to agitate the several states of Greece. This famous history is continued only to the 21st year of the war, and the remaining part of the time till the demolition of the walls of Athens was described by the pen of Theopompus and Xenophon. Thucydides wrote in the Attic dialect, as being possessed of most vigour, purity, elegance, and energy. He spared neither time nor money to procure authentic materials; and the Athenians, as well as their enemies, furnished him with many valuable communications, which contributed to throw great light on the different transactions of the war. His history has been divided into eight books; the last of which is imperfect, and supposed to have been written by his daughter.

The historian of Halicarnassus has often been compared with the son of Olorus, but each has his peculiar excellence. Sweetness of style, grace and elegance of expression, may be called the characteristics of the former; while Thucydides stands unequalled for the fire of his descriptions, the conciseness, and at the same time the strong and energetic manner of his narratives. His relations are authentic, as he himself was interested in the events he mentions; his impartiality is undubitable, as he nowhere betrays the least resentment against his countrymen, and the factious partizans of Cleon, who had banished him from Athens. The history of Thucydides was so admired by Demosthenes, that he transcribed it eight different times, and read it with such attention, that he could almost repeat it by heart. Thucydides died at Athens, where he had been recalled from his exile about 411 years before Christ.

The

Thuja
||
Thunbergia.

The best edition of Thucydides is that of Oxford, published in 1696, folio, and that of Duker, published at Amsterdam in 1731, folio.

THUJA, the ARBOR VITÆ, in botany: A genus of plants belonging to the class of *monodelphia*, and order of *monœcia*; and in the natural system ranging under the 51st order, *Conifera*. There are four species known; the *orientalis*, *occidentalis*, *apylla*, and *dolabrata*; of which the two first are most remarkable.

The *occidentalis*, or common arbor vitæ, grows naturally in Canada, Siberia, and other northern countries. In some of the English gardens a few of these trees are to be met with of a large size: it has a strong woody trunk, which rises to the height of 40 feet or more. The bark, while young, is smooth, and of a dark brown colour; but as the trees advance, the bark becomes cracked, and less smooth. The branches are produced irregularly on every side, standing almost horizontal, and the young slender shoots frequently hang downward, thinly garnished with leaves; so that when the trees are grown large they make but an indifferent appearance. The young branches are flat, and their small leaves lie imbricated over each other like the scales of a fish; the flowers are produced from the side of the young branches pretty near to the foot-stalk; the male flowers grow in oblong catkins, and between these the female flowers are collected in form of cones. When the former have shed their farina, they soon after drop off; but the female flowers are succeeded by oblong cones, having obtuse smooth scales, containing one or two oblong seeds. The leaves of this tree have a rank oily scent when bruised.

2. The *orientalis*, or China arbor vitæ, grows naturally in the northern parts of China, where it rises to a considerable height; but this has not been long enough in Europe to have any trees of large size. The seeds of this sort were first sent to Paris by some of the missionaries; and there are some of the trees growing in the gardens of the curious there, which are more than 20 feet high. The branches of this sort grow closer together, and are much better adorned with leaves, which are of a brighter green colour, so make a much better appearance than the other, and being very hardy, it is esteemed preferable to most of the evergreen trees with small leaves, for ornament in gardens. The branches of this tree cross each other at right angles: the leaves are flat; but the single divisions of the leaves are slender, and the scales are smaller and lie closer over each other than those of the first sort. The cones are also much larger, and of a beautiful grey colour; their scales end in acute reflexed points.

These trees are propagated by seeds, layers, or cuttings.

THULE, or THYLÆ, (anc. geog.), an island in the most northern parts of the German Ocean. Its situation was never accurately ascertained by the ancients, hence its present name is unknown by modern historians. Some suppose that it is the island now called Iceland, or part of Greenland, and others that it was *Foula*. See FOULA.

THUMB, in anatomy, one of the extremities of the hand.

THUMB-Cap, an island in the South Sea, lies about seven leagues north-west of Lagoon-island; it is a low, woody island, of a circular form, and not much above a mile in compass. There was no appearance of inhabitants; the land was covered with verdure of many hues.

THUMMIM. See URIM.

THUNBERGIA, in botany; a genus of plants belonging to the class of *didynamia*, and order of *angiosperma*. The calyx is double; the exterior one is diphylous, and the interior one multipartite. The capsule is globose, beaked,

and bilocular. There is only one species known, the *capensis*. Thunder.

THUNDER, the noise occasioned by the explosion of a flash of lightning echoed back from the inequalities on the surface of the earth, in like manner as the noise of a cannon is echoed, and in particular circumstances forms a rolling lengthened sound.

Although *thunder*, properly speaking, is only a mere sound, capable of producing very little effect, yet the word is generally supposed to include the phenomena of lightning also; and electrified clouds are by universal consent called *thunder clouds*, and the explosions of many flashes of lightning proceeding from them are generally called *thunder-storms*. Though the phenomena of lightning, therefore, have been at a great length explained and accounted for under the articles ELECTRICITY and LIGHTNING, and though the immediate cause of electrical explosions from clouds is explained under the article RAIN; yet the ultimate cause remains still to be shown, and properly belongs to the present article.

It is universally allowed, that the variation of the electricity in different parts of the atmosphere is the cause of thunder. Under the article ELECTRICITY, it has been shown why lightning explodes after the thunder-clouds are charged. Under the article LIGHTNING, it is shown why that meteor puts on the various forms in which we see it, why it sometimes strikes houses or animals, and sometimes not, &c.; and under the article RAIN, why the atmosphere in some cases parts with the vapours which at other times it so obstinately retains. It remains therefore only to mention the theory by which some philosophers explain the reason why rains are sometimes attended with thunder, and sometimes not; which, to those who attentively peruse the articles above-mentioned, may be done in few words.

In this part of Great Britain, and for a considerable way along the eastern coast, although thunder may happen at any time of the year, yet the month of July is that in which it may almost certainly be expected. Its duration is of very uncertain continuance; sometimes only a few peals will be heard at any particular place during the whole season; at other times the storm will return at the interval of three or four days for a month, six weeks, or even longer; not that we have violent thunder in this country directly vertical in any one place so frequently in any year, but in many seasons it will be perceptible that thunder-clouds are formed in the neighbourhood even at these short intervals. Hence it appears, that during this particular period there must be some natural cause operating for the production of this phenomenon, which does not take place at other times. This cannot be the mere heat of the weather, for we have often a long tract of hot weather without any thunder; and besides, though not common, thunder is sometimes heard in the winter also. As therefore the heat of the weather is common to the whole summer, whether there be thunder or not, we must look for the causes of it in those phenomena, whatever they are, which are peculiar to the months of July, August, and the beginning of September. Now it is generally observed, in the tract of country of which we now speak, that from the month of April an east or south-east wind generally takes place, and continues with little interruption till towards the end of June. At that time, sometimes sooner and sometimes later, a westerly wind takes place; but as the causes producing the east wind are not removed, the latter opposes the west wind with its whole force. At the place of meeting, there is naturally a most vehement pressure of the atmosphere, and friction of its parts against one another; a calm ensues, and the vapours brought by both winds begin to collect and form dark clouds, which

Thunder. can have little motion either way, because they are pressed almost equally on all sides. For the most part, however, the west wind prevails, and what little motion the clouds have is towards the east: whence the common remark in this country, that "thunder-clouds move against the wind." But this is by no means universally true: for if the west wind happens to be excited by any temporary cause before its natural period when it should take place, the east wind will very frequently get the better of it; and the clouds, even although thunder is produced, will move westward. Yet in either case the motion is so slow, that the most superficial observers cannot help taking notice of a considerable resistance in the atmosphere.

That when two streams of air are thus driven against each other, the space where they meet must become highly electrified, is as plain as that an electric globe must be excited when friction is applied. It is true, as the substances here to be excited are both electrics *per se*, it may be objected, that no electricity could be produced; for we cannot excite one electric by rubbing it with another. Yet it is observed, that glass may be electrified by blowing strongly upon it, or by the explosion of cannon; and even when glass is strongly pressed upon glass, both pieces become electrified as soon as they are separated. When glass is rubbed upon glass, no attraction nor repulsion can be perceived, nor is any sign of electricity observed on bodies brought near to it; yet a very bright electric light always appears on the glasses, and a phosphoreal smell is felt; which shows, that though the electricity does not fly out through the air in the usual way, yet the fluid within the glass is agitated; and there is little reason to doubt that any conducting body inclosed within the substance of the glass would be electrified also. The vapours therefore, which are the conducting substances in the atmosphere, become immediately electrified in consequence of the pressure above-mentioned, and all the phenomena described under the various articles already referred to take place.

In like manner, by the struggle of two other winds as well as those of the east and west, may a thunder-storm be produced; but it is always necessary that the resistance of the air to the motion of the clouds should be very great, and nearly equal all round. For if the vapour should get off to a side, no thunder would take place; the electricity would then be carried off as fast as it was collected, and rain would only be the consequence, by reason of the electrified vapours parting with their latent heat, as is explained under the article RAIN. In fact, we very often observe, that in the time of rain the clouds evidently move across the wind, and the nearer their motion is to a direct opposition, the heavier will the rain be; while, on the other hand, if they move briskly before the wind, let the direction be what it will, the atmosphere soon clears up.

That rattling in the noise of thunder which makes it seem as if it passed thro' arches, or were variously broken, is probably owing to the sound being excited among clouds hanging over one another, and the agitated air passing irregularly between them. The explosion, if high in the air, and remote from us, will do no mischief; but when near, it may destroy trees, animals, &c. This proximity or small distance may be estimated nearly by the interval of time between seeing the flash of lightning and hearing the report of the thunder, estimating the distance after the rate of 1142 feet *per* second of time, or three two-third seconds to the mile. Dr Wallis observes, that commonly the difference between the two is about seven seconds, which, at the rate above-mentioned, gives the distance almost two miles. But sometimes it comes in a second or two, which argues the explosion very near us, and even among us. And in such

cases, the Doctor assures us, he has sometimes foretold the Thunder-mischief that happened.

The noise of thunder and the flame of lightning are easily made by art. If a mixture of oil or spirit of vitriol be made with water, and some filings of steel added to it, there will immediately arise a thick smoke or vapour out of the mouth of the vessel; and if a lighted candle be applied to this, it will take fire, and the flame will immediately descend into the vessel, which will be burst to pieces with a noise like that of a cannon.

This is so far analogous to thunder and lightning, that a great explosion and fire are occasioned by it; but in this they differ, that this matter when once fired is destroyed, and can give no more explosions; whereas, in the heavens, one clap of thunder usually follows another, and there is a continued succession of them for a long time. Mr Homberg explained this by the lightness of the air above us in comparison of that near, which therefore would not suffer all the matter so kindled to be dissipated at once, but keeps it for several returns.

Respecting the phenomena of thunder, we have many observations to communicate; some of which, we flatter ourselves, are new, and all of them valuable; but our bounds oblige us, though with great reluctance, to pass them over.

THUNDERBOLT. When lightning acts with extraordinary violence, and breaks or shatters any thing, it is called a *thunderbolt*, which the vulgar, to fit it for such effects, suppose to be a hard body, and even a stone. But that we need not have recourse to a hard solid body to account for the effects commonly attributed to the thunderbolt, will be evident to any one who considers those of the pulvis fulminans and of gunpowder; but more especially the astonishing powers of electricity, when only collected and employed by human art, and much more when directed and exercised in the course of nature.

When we consider the known effects of electrical explosions, and those produced by lightning, we shall be at no loss to account for the extraordinary operations vulgarly ascribed to thunderbolts. As stones and bricks struck by lightning are often found in a vitrified state, we may reasonably suppose, with Beccaria, that some stones in the earth having been struck in this manner, gave occasion to the vulgar opinion of the thunderbolt.

THUNDER-HOUSE. See ELECTRICITY, p. 474.

THURINGIA, a division of the circle of Upper Saxony in Germany. It is a fruitful tract, abounding in corn, especially wheat; in black cattle, sheep, and horses. It is about 73 miles in length, and as much in breadth. It contains 47 towns, 14 boroughs, betwixt 700 and 800 villages, 300 noble estates, 7 superintendencies, and 5 under-consistories. Thuringia, the country of the ancient *Thuringi*, or *Catti*, a branch of the Vandals, mentioned by Tacitus, was formerly a kingdom, afterwards a county, then a landgravate, and was governed by its own princes for many ages, till 1124, when it devolved to the marquis of Misnia, and, with that country, afterwards to the duke of Saxony. But the modern Thuringia is only a part of the ancient, nay, but a part of the ancient South Thuringia, which comprehends besides, a large share of the modern Franconia, Hesse, &c. On the extinction of the male line of the ancient landgraves in 1247, it came to the margraves of Meissen, ancestors to the present electoral family. The elector has no voice in the diet, on account of his share in the landgravate or circle of Thuringia. Erfurt is the capital.

THURLOE (John), an English statesman under Oliver Cromwell, was born at Abots Roding in Essex in 1616, of which parish his father was rector, and was educated to the

Thunder-
bolt
||
Thurloc.

Thursday the study of the law. In 1648 he was made receiver or clerk of the curfitor fines; and though his attachments were entirely on the side of the parliament, he declares himself totally unconcerned in all counsels relative to the death of the king: however, on that event, and on the establishment of the commonwealth, he was diverted from prosecuting his employments in the law by engaging in public business. When Cromwell assumed the protectorship, he became secretary of state; in 1655, he had the care and charge both of foreign and inland postage committed to him by the protector; and was afterward sworn one of his privy-council, according to "The humble petition and advice." He was continued in the same capacities under Richard Cromwell, and until measures were taken for the Restoration; when he made an offer of his services to that end, which, however, were not accepted. May 15th 1660, he was committed to the custody of the serjeant at arms on a charge of high treason; but being soon released, he retired to Great Milton in Oxfordshire: and though he was afterward often solicited by Charles II. to engage in the administration of public business, he thought proper to decline the offers. He died in 1668: and was a man of an amiable private character, who in the highest of his power exercised all possible moderation towards persons of every party. The most authentic testimony of his abilities is that vast collection of state-papers, seven volumes folio, now in the hands of the public; which place the affairs of Great Britain, and of Europe in general, during that remarkable period in the clearest light.

THURSDAY, the fifth day of the Christian week, but the sixth of that of the Jews.

THUS, FRANKINCENSE, a solid brittle resin, brought to us in little globes or masses, of a brownish or yellowish colour on the outside, internally whitish or variegated with whitish specks. It is supposed to be the produce of the pine that yields the common turpentine, and to concrete upon the surface of the terebinthinate juice soon after it has issued from the tree. See **INCENSE**.

THUYA. See **THUJA**.

THYMUS, THYME, in botany: A genus of plants belonging to the class of *didynamia*, and order of *gymnospermia*; and in the natural system ranging under the 42d order, *Verticillata*. The calyx is bilabiate, and its throat closed with soft hairs. There are 11 species; of which two only are natives of Britain, the *serpyllum* and *acinas*.

1. The *serpyllum*, or mother of thyme, has pale red flowers growing on round heads, terminal; the stalks are procumbent, and the leaves plane, obtuse, and ciliated at the base.
2. The *acinas*, or wild basil, has flowers growing in whirls on single footstalks; the stalks are erect and branched; the leaves acute and serrated. The *thymus vulgaris*, or garden thyme, is a native of France, Spain, and Italy.—The attachment of bees to this and other aromatic plants is well known. In the experiments made at Upsal, sheep and goats were observed to eat it, and swine to refuse it.

THYMUS, in anatomy. See **ANATOMY**, n° 114.

THYRSUS, in antiquity, the sceptre which the poets put into the hand of Bacchus, and wherewith they furnished the menades in their Bacchanalia.

THYRSUS, in botany, a mode of flowering resembling the cone of a pine. It is, says Linnæus, a panicle contracted into an oval or egg-shaped form. The lower footstalks, which are longer, extend horizontally, whilst the upper ones are shorter and mount vertically. Lilac and butter-bur furnish examples.

TIARA, an ornament or habit wherewith the ancient Persians covered their head; and with which the Armenians and kings of Pontus are represented on medals; there

last, because they were descended from the Persians. Latin authors call it indifferently *tiara* and *cidaris*. Strabo says, the tiara was in form of a tower; and the scholiast on Aristophanes's comedy, *Αχρης*, act 1. scene 2. affirms, that it was adorned with peacock's feathers.

TIARA is also the name of the pope's triple crown. The tiara and keys are the badges of the papal dignity; the tiara of his civil rank, and the keys of his jurisdiction: for as soon as the pope is dead, his arms are represented with the tiara alone, without the keys. The ancient tiara was a round high cap. John XXIII. first encompassed it with a crown. Boniface VIII. added a second crown; and Benedict XII. a third.

TIARELLA, in botany: A genus of plants belonging to the class of *decandria*, and order of *digynia*; and in the natural system ranging under the 13th order, *Succulentæ*. The calyx is quinquepartite; the corolla pentapetalous, and inserted into the calyx; the petals are entire; the capsule is unilocular and bivalve, the one valve being less than the other. There are two species, the *cordifolia* and *trifoliata*.

TIBER, a great river of Italy, which runs through the pope's territories, passing by Perugia and Orvietto; and having visited Rome, falls into the Tuscan sea at Ostia, fifteen miles below that city.

TIBET, called by the Tartars *Barantola*, *Bootan*, or *Tangoot*, and by the Chinese *Tsang*, is situated between 26° and 39° north latitude; and, according to Abbé Grosier, is reckoned to be 640 leagues from east to west, and 650 from north to south. It is bounded on the north by the country of the Mongols and the desert of Kobi; on the east by China; on the west by Hindostan, and on the south by the same country and the kingdom of Ava. In the valleys lying between the lower mountains are many tribes of Indian people; and a dispute happening between the heirs of one of the rajahs or petty princes, one party called to their assistance the Boutaners, and the other the British. The latter prevailed; and the fame of British valour being carried to the court of Tibet, the Teeshoo-Lama, who ruled the state under the Delai-Lama, at that time in his minority, sent a deputation to Bengal, desiring peace for the prince who had been engaged in war with the British. This was readily granted by the governor; and Mr Bogle was sent ambassador to the court of Tibet, where he resided several months; and after an absence of a year and a quarter, returned to Calcutta. The account of this gentleman's expedition hath not been published by himself; but from Mr Stewart's letter to Sir John Pringle, published in the Philosophical Transactions, vol. 67. we learn the following particulars, collected from his papers.

"Mr Bogle divides the territories of the Delai-Lama into two different parts. That which lies immediately contiguous to Bengal, and which is called by the inhabitants *Doepo*, he distinguishes by the name of *Bootan*; and the other, which extends to the northward as far as the frontiers of Tartary, called by the natives *Pu*, he styles *Tibet*. Bootan is ruled by the Dah Terriah, or Deb Rajah. It is a country of steep and inaccessible mountains, whose summits are crowned with eternal snow; they are intersected with deep valleys, through which pour numberless torrents that increase in their course, and at last, gaining the plains, lose themselves in the great rivers of Bengal. These mountains are covered down their sides with forests of stately trees of various sorts; some (such as pines, &c.) which are known in Europe; others, such as are peculiar to the country and climate. The valleys and sides of the hills which admit of cultivation are not unfruitful, but produce crops of wheat, barley, and rice. The inhabitants are a stout and warlike people, of a copper complexion, in size rather above

Tiara
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Tibet.

Tibet.

above the middle European stature, hasty and quarrelsome in their temper, and addicted to the use of spirituous liquors; but honest in their dealings, robbery by violence being almost unknown among them. The chief city is Tassei Seddein situated on the Patchoo. Tibet begins properly from the top of the great ridge of the Caucasus, and extends from thence in breadth to the confines of Great Tartary, and perhaps to some of the dominions of the Russian empire. The woods, which everywhere cover the mountains in Boutan, are here totally unknown; and, except a few straggling trees near the villages, nothing of the sort to be seen. The climate is extremely severe and rude. At Chamnanning, where he wintered, although it be in latitude $31^{\circ} 39'$, only 8° to the northward of Calcutta, he often found the thermometer in his room at 29° by Fahrenheit's scale; and in the middle of April the standing waters were all frozen, and heavy showers of snow perpetually fell. This, no doubt, must be owing to the great elevation of the country, and to the vast frozen space over which the north wind blows uninterruptedly from the pole, through the vast deserts of Siberia and Tartary, till it is stopped by this formidable wall.

"The Tibetians are of a smaller size than their southern neighbours, and of a less robust make. Their complexions are also fairer, and many of them have even a ruddiness in their countenances unknown in the other climates of the east. Those whom Mr Bogle saw at Calcutta appeared to have quite the Tartar face. They are of a mild and cheerful temper; the higher ranks are polite and entertaining in conversation, in which they never mix either strained compliments or flattery. The common people, both in Bootan and Tibet, are clothed in coarse woollen stuffs of their own manufacture, lined with such skins as they can procure; but the better orders of men are dressed in European cloth, or China silk, lined with the finest Siberian furs. The use of linen is totally unknown among them. The chief food of the inhabitants is the milk of their cattle, prepared into cheese, butter, or mixed with the flour of a coarse barley or of pease, the only grain which their soil produces; and even these articles are in a scanty proportion: but they are furnished with rice and wheat from Bengal and other countries in their neighbourhood. They also are supplied with fish from the rivers in their own and the neighbouring provinces, salted and sent into the anterior parts. They have no want of animal food from the cattle, sheep, and hogs, which are raised on their hills; and are not destitute of game. They have a singular method of preparing their mutton, by exposing the carcase entire, after the bowels are taken out, to the sun and bleak northern winds which blow in the months of August and September, without frost, and so dry up the juices and parch the skin, that the meat will keep uncorrupted for the year round. This they generally eat raw, without any other preparation.

"The religion and political constitution of this country, which are intimately blended together, would make a considerable chapter in its history. It suffices to say, that at present, and ever since the expulsion of the Eluth Tartars, the kingdom of Tibet is regarded as depending on the empire of China, which they call *Cathay*; and there actually reside two mandarines, with a garrison of a thousand Chinese, at Lahassa the capital, to support the government; but their power does not extend far: and in fact the Lama, whose empire is founded on the surest grounds, personal affection and religious reverence, governs every thing internally with unbounded authority. Every body knows that the Delai Lama is the great object of adoration for the various tribes of heathen Tartars, who roam through the vast tract of continent which stretches from the banks

of the Volga to Corea on the sea of Japan, the most extensive religious dominion, perhaps, on the face of the globe. See LAMA.

"It is an old notion, that the religion of Tibet is a corrupted Christianity: and even Father Disederii, a Jesuit (but not of the Chinese mission) who visited the country about the beginning of this century, thinks he can resolve all their mysteries into ours; and asserts, with a truly mystical penetration, that they have certainly a good notion of the Trinity, since in their address to the Deity, they say as often *konciok-oik* in the plural as *konciok* in the singular, and with their rosaries pronounce these words, *om, ha, hum*. The truth is, that the religion of Tibet, from whatever source it sprung, is pure and simple in its source, conveying very exalted notions of the Deity, with no contemptible system of morality: but in its progress it has been greatly altered and corrupted by the inventions of worldly men; a fate we can hardly regret in a system of error, since we know that that of truth has been subject to the same. Polygamy, at least in the sense we commonly receive the word, is not in practice among them; but it exists in a manner still more repugnant to European ideas; for there is a plurality of husbands, which is firmly established and highly respected there. In a country where the means of subsisting a family are not easily found, it seems not impolitic to allow a set of brothers to agree in raising one, which is to be maintained by their joint efforts. In short, it is usual in Tibet for the brothers in the family to have a wife in common, and they generally live in great harmony and comfort with her; not but sometimes little dissensions will arise (as may happen in families constituted upon different principles), an instance of which Mr Bogle mentions in the case of a modest and virtuous lady, the wife of half a dozen of the Teeshoo Lama's nephews, who complained to the uncle that the two youngest of her husbands did not furnish that share of love and benevolence to the common stock which duty and religion required of them. In short, however strange this custom may appear to us, it is an undoubted fact that it prevails in Tibet.

"The manner of bestowing their dead is also singular: they neither put them in the ground like the Europeans, nor burn them like the Hindoos; but expose them on the bleak pinnacle of some neighbouring mountain, to be devoured by wild beasts and birds of prey, or wasted away by time and the vicissitudes of the weather in which they lie. The mangled carcases and bleached bones lie scattered about; and amidst this scene of horror, some miserable old wretch, man or woman, lost to all feelings but those of superstition, generally sets up an abode, to perform the dismal office of receiving the bodies, assigning each a place, and gathering up the remains when too widely dispersed."

To the account of Tibet which we have given from the communications of Mr Bogle, we may add the information which we have obtained from a later traveller, Mr Saunders* * *Paper to the Phil. Transf. Vol. LXXIX.* surgeon at Boglepoer in Bengal, who made a journey into Tibet in the year 1783. His observations chiefly respect the natural productions and diseases of the country.

The plants which Mr Saunders found were almost all European plants, a great number of them being natives of Britain. From the appearance of the hills he concludes that they must contain many ores of metal and pyrites. There are inexhaustible quantities of TINCAL (see that article), and rock-salt is plentiful; gold-dust is found in great quantities in the beds of rivers, and sometimes in large masses, lumps, and irregular veins; lead, cinnabar containing a large proportion of quicksilver, copper, and iron, he thinks, might easily be procured. But the inhabitants of Tibet have no better fuel than the dung of animals. A coal mine

Tiber,
Tibullus.

mine would be a valuable discovery. We are told, that in some parts of China bordering on Tibet coal is found and used as fuel.

It is remarkable that the same disease prevails at the foot of the mountains of Tibet as in Switzerland at the foot of the Alps, a glandular swelling in the throat commonly called *goitre*. This disease has been ascribed to the use of snow-water, which flows down in streams from the mountains in both countries. But in many countries where snow-water is abundant it does not prevail, and in other places far remote from snow it is not unfrequent, as in Sumatra. Mr Saunders thinks that it arises from the air peculiar to the vicinity of certain mountains; and finding the vegetable productions of the mountains of Tibet the same with those of the Alps, that they also may have their influence. An analysis of the water where this disease prevails might throw some light on the subject. We have heard it attributed to the impregnation of water with *tufa*. This very extraordinary disease has been little attended to, from obvious reasons; it is unaccompanied with pain, seldom fatal, and generally confined to the poorer sort of people. The tumor is unsightly, and grows to a troublesome size, being often as large as a person's head. It is certainly not exaggerating to say, that one in six of the Rungpore district, and country of Bootan, has the disease.

As those who labour most, and are the least protected from the changes of weather, are most subject to the disease, we universally find it in Bootan more common with the women than men. It generally appears in Bootan at the age of thirteen or fourteen, and in Bengal at the age of eleven or twelve; so that in both countries the disease shows itself about the age of puberty. I do not believe this disease has ever been removed, though a mercurial course seemed to check its progress, but did not prevent its advance after intermitting the use of mercury. An attention to the primary cause will first lead to a proper method of treating the disease; a change of situation for a short while, at that particular period when it appears, might be the means of preventing it.

The venereal disease is not uncommon in Tibet; and what will perhaps surprize the physician, the inhabitants are acquainted with the effects of mercury, and with a method of preparing it so as to render it a safe and efficacious remedy. They know how to deprive it of its metallic form by mixing it with alum, nitre, and vermilion, and exposing it to a certain degree of heat, which they judge of by weighing the fuel.

The language spoken in Tibet is different from that of the Tartars. The astronomers are acquainted with the motion of the heavenly bodies, and able to calculate eclipses: but the lamas are generally ignorant; few of them can read, much less understand their ancient books.

TIBULLUS (Aulus Albius), a Roman knight, and a celebrated Latin poet, was born at Rome 43 B. C. He was the friend of Horace, Ovid, Macer, and other great men in the reign of Augustus. He accompanied Messala Corvinus in his expedition against the island of Coreyra: but falling sick, and being unable to support the fatigues of war on account of the weakness of his constitution, he quitted the profession of arms, and returned to Rome, where he died before the year 17; when Ovid showed his grief for his death by writing a fine elegy upon him. Tibullus wrote four books of elegies, which are still extant: they are written in a tender and agreeable style, and in very elegant Latin. Muret and Joseph Scaliger have written learned and curious commentaries on the works of this poet. The best edition of Tibullus is that of Janus Bronckhusius, published at Amsterdam in 1708, in one Vol. XVIII. Part II.

volume quarto. We have an English poetical version by Mr Grainger.

TIBUR, (anc. geog.) a town of Latium, pleasantly situated on the Anio. Here Horace had his villa and house; and here he wished to end his days. Here Adrian built an extraordinary villa called *Tiburtina*, inscribed with the names of the provinces and of the most considerable places, (Spartian); near which Zenobia had a house called *Zenobia*, (Trebellius, Pollio). Hither Augustus often retreated on account of its salubrity, (Suetonius): for which it is greatly commended, (Martial). Anciently, when the Romans had far extended their territory, it was the utmost place of banishment, (Ovid). It had a temple of Hercules; and therefore called *Herculeum*. In the temple was a library, (A. Gellius). Now *Tivoli* in the Campagna di Roma on the Teverone.

TICINUS, (anc. geog.) a river in Insubria, rising in mount Adula, traversing the Lacus Verbanus southwards, and falling into the Po near Ticinum. Between this river and the Po Hannibal gained his first victory over the Romans under P. Scipio. The general himself escaped with the utmost difficulty, and that by the bravery of his son the first Scipio Africanus. Now the *Tesino*, rising in mount Godard, running south through the Lago Maggiore and Milan, by Pavia, into the Po.

TICK, in zoology. See **ACARUS**.

TICKELL (Thomas), an excellent English poet, was the son of the Reverend Richard Tickell, and was born in 1686, at Bridekirk in Cumberland. He was educated at Queen's college, Oxford, of which he was made fellow; and while he continued at that university, he addressed to Mr Addison a complimentary copy of verses on his Opera of Rosamond, which introduced him to an acquaintance with that gentleman, who discovering his merit, became his sincere friend. On Mr Addison's being made secretary of state, he appointed Mr Tickell his under-secretary; and on his being obliged to resign that office on account of his ill health, he recommended him so effectually to Mr Craggs his successor, that he was continued in his post till that gentleman's death. In 1724 Mr Tickell was appointed secretary to the lords justices in Ireland, and enjoyed that place as long as he lived. He wrote some poems, which, when separately published, met with a favourable reception, and passed through several editions: they are now printed in the second volume of The Minor Poets. After Mr Addison's death Mr Tickell had the care of the edition of his works printed in 4 vols 4to; to which he prefixed an account of Mr Addison's life, and a poem on his death. Mr Tickell died in the year 1740.

TICKERA, a considerable article of merchandise in Fezzan in Africa; it is valued by travellers as a portable and highly salubrious food. It is a preparation of pounded dates, and the meal of Indian corn, formed into a paste, and highly dried in an oven.

TICKSEED, **SUN-FLOWER**. See **COREOPSIS**.

TICUNAS. See **POISON**, p. 266.

TIDE, is a word which expresses that rising and falling of the waters which are observed on all maritime coasts.

There is a certain depth of the waters of the ocean which would obtain if all were at rest: but observation shows that they are continually varying from this level, and that some of these variations are regular and periodical.

1/2, It is observed, that on the shores of the ocean, and in bays, creeks, and harbours, which communicate freely with the ocean, the waters rise up above this mean height twice a-day, and as often sink below it, forming what is called a **FLOOD** and an **EBB**, a **HIGH** and a **LOW WATER**. The whole interval between high and low water is called a **TIDE**; the

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Tide.

Tide. the water is said to FLOW and to EBB; and the rising is called the FLOOD-TIDE, and the falling is called the EBB TIDE.

2d. It is observed, that this rise and fall of the waters is variable in quantity. At Plymouth, for instance, it is sometimes 21 feet between the greatest and least depth of the water in one day, and sometimes only 12 feet.

These different heights of tide are observed to succeed each other in a regular series, diminishing from the greatest to the least, and then increasing from the least to the greatest. The greatest is called a SPRING TIDE, and the least is called a NEAP TIDE.

3d. This series is completed in about 15 days. More careful observation shows that two serieses are completed in the exact time of a lunation. For the spring tide in any place is observed to happen precisely at a certain interval of time (generally between two and three days) after new or full moon, and the neap tide at a certain interval after half moon; or, more accurately speaking, it is observed that the spring tide always happens when the moon has got a certain number of degrees eastward of the line of conjunction and opposition, and the neap tide happens when she is a certain number of degrees from her first or last quadrature. Thus the whole series of tides appears to be regulated by the moon.

4th. It is observed that high water happens at new and full moon when the moon has a certain determined position with respect to the meridian of the place of observation, preceding or following the moon's southing a certain interval of time; which is constant with respect to that place, but very different in different places.

5th. The time of high water in any place appears to be regulated by the moon; for the interval between the time of high water and the moon's southing never changes above three quarters of an hour, whereas the interval between the time of high water and noon changes six hours in the course of a fortnight.

6th. The interval between two succeeding high waters is variable. It is least of all about new and full moon, and greatest when the moon is in her quadratures. As two high waters happen every day, we may call the double of their interval a TIDE DAY, as we call the diurnal revolution of the moon a lunar day. The tide day is shortest about new and full moon, being then about $24^h 37'$; about the time of the moon's quadratures it is $25^h 27'$. These values are taken from a mean of many observations made at Barbadoes by Dr Maskelyne.

7th. The tides in similar circumstances are greatest when the moon is at her smallest distance from the earth, or in her perigee, and, gradually diminishing, are smallest when she is in her apogee.

8th. The same remark is made with respect to the sun's distance, and the greatest tides are observed during the winter months of Europe.

9th. The tides in any part of the ocean increase as the moon, by changing her declination, approaches the zenith of that place.

10th. The tides which happen while the moon is above the horizon are greater than the tides of the same day when the moon is below the horizon.

Such are the regular phenomena of the tides. They are important to all commercial nations, and have therefore been much attended to. It is of the tides, in all probability, that the Bible speaks, when God is said to set bounds to the sea, and to say "this far shall it go, and no farther."

Homer is the earliest profane author who speaks of the tides. Indeed it is not very clear that it is of them that he speaks (in the XIIth book of the Odyssey) when he speaks of

Charybdis, which rises and retires thrice in every day. Herodotus and Diodorus Siculus speak more distinctly of the tides in the Red Sea. Pytheas of Marseilles is the first who says any thing of their cause. According to Strabo he had been in Britain, where he must have observed the tides of the ocean. Plutarch says expressly that Pytheas ascribed them to the moon. It is somewhat wonderful that Aristotle says so little about the tides. The army of Alexander, his pupil, were startled at their first appearance to them near the Persian Gulph; and we should have thought that Aristotle would be well informed of all that had been observed there. But there are only three passages concerning them in all Aristotle's writings, and they are very trivial. In one place he speaks of great tides observed in the north of Europe; in another, he mentions their having been ascribed by some to the moon; and in a third, he says, that the tide in a great sea exceeds that in a small one.

The Greeks had little opportunity of observing the tides. The conquests and the commerce of the Romans gave them more acquaintance with them. Cæsar speaks of them in the 4th book of his Gallic War. Strabo, after Posidonius, classes the phenomena into daily, monthly, and annual. He observes, that the sea rises as the moon gets near the meridian, whether above or below the horizon, and falls again as she rises or falls; also, that the tides increase at the time of new and full moon, and are greatest at the summer solstice. Pliny explains the phenomena at some length; and says, that both the sun and moon are their cause, dragging the waters along with them (B. II. c. 97). Seneca (*Nat. Quest.* III. 28.) speaks of the tides with correctness; and Macrobius (*Sonn. Scip.* I. 6.) gives a very accurate description of their motions.

It is impossible that such phenomena should not exercise human curiosity as to their cause. Plutarch (*Plaut. Phil.* III. 17), Galileo (*Syst. Mund.* Dial. 4.), Riccioli in his *Almagest*, ii. p. 374, and Gassendi, ii. p. 27 have collected most of the notions of their predecessors on the subject; but they are of so little importance, that they do not deserve our notice. Kepler speaks more like a philosopher (*De Stella Martis*, and *Epit. Astron.* p. 555). He says that all bodies attract each other, and that the waters of the ocean would all go to the moon were they not retained by the attraction of the earth; and then goes on to explain their elevation under the moon and on the opposite side, because the earth is less attracted by the moon than the nearer waters, but more than the waters which are more remote.

The honour of a complete explanation of the tides was reserved for Sir Isaac Newton. He laid hold of this class of phenomena as the most incontestable proof of universal gravitation, and has given a most beautiful and synoptical view of the whole subject; contenting himself, however, with merely exhibiting the chief consequences of the general principle, and applying it to the phenomena with singular address. But the wide steps taken by this great philosopher in his investigation leave ordinary readers frequently at fault: many of his assumptions require the greatest mathematical knowledge to satisfy us of their truth. The academy of Paris therefore proposed to illustrate this among other parts of the principles of natural philosophy, and published the theory of the tides as a prize problem. This produced three excellent dissertations, by M^r Laurin, Dan. Bernoulli, and Euler. Aided by these, and chiefly by the second, we shall here give a physical theory, and accommodate it to the purposes of navigation by giving the rules of calculation. We have demonstrated in our dissertations on the physical principles of the celestial motions, that it is an unexcepted fact, that every particle of matter in the solar system is actually deflected toward every other particle; and that

that the deflection of a particle of matter toward any distant sphere is proportional to the quantity of matter in that sphere directly, and to the square of the distance of the particle from the centre of that sphere inversely: and having found that the heaviness of a piece of terrestrial matter is nothing but the supposed opponent to the force which we exert in carrying this piece of matter, we conceive it as possessing a property, that is, distinguishing quality, manifested by its being *gravis* or heavy. This is heaviness, *gravitas*, gravity; and the manifestation of this quality, or the event in which it is seen, whether it be directly falling, or deflecting in a parabolic curve, or stretching a coiled spring, or breaking a rope, or simply pressing on its support, is *gravitatio*, gravitation; and the body is said to gravitate. When all obstacles are removed from the body, as when we cut the string by which a stone is hung, it moves directly downwards, *tendit ad terram. Si discindatur funis, tenderet lapis ad terram. Dum vero funis integer perflet, lapis terram versus niti censetur.* By some metaphysical process, which it is needless at present to trace, this *nisus ad motum* has been called a *tendency* in our language. Indeed the word has now come to signify the energy of any active quality in those cases where its simplest and most immediate manifestation is prevented by some obstacle. The stone is now said to tend toward the earth, though it does not actually approach it, being withheld by the string. The stretching the string in a direction perpendicular to the horizon is conceived as a full manifestation of this tendency. This tendency, this inergy of its heaviness, is therefore named by the word which distinguishes the quality; and it is called *gravitation*, and it is said to *gravitate*.

But Sir Isaac Newton discovered that this deflection of a heavy body differs in no respect from that general deflection observed in all the bodies of the solar system. For 16 feet, which is the deflection of a stone in one second, has the very same proportion to $\frac{1}{12}$ th of an inch, which is the simultaneous deflection of the moon, that the square of the moon's distance from the centre of the earth has to the square of the stone's distance from it, namely, that of 3600 to 1.

Thus we are enabled to compare all the effects of the mutual tendencies of the heavenly bodies with the tendency of gravity, whose effects and measures are familiar to us.

If the earth were a sphere covered to a great depth with water, the water would form a concentric spherical shell; for the gravitation of every particle of its surface would then be directed to the centre, and would be equal. The curvature of its surface therefore would be every where the same, that is, it would be the uniform curvature of a sphere.

It has been demonstrated in former articles, after Sir Isaac Newton, that the gravitation of a particle C (fig. 1.) to the centre O, is to that of a particle E at the surface as CO to EO. In like manner the gravitation of *o* is to that of *p* as *o* O to *p* O. If therefore EO and Op are two communicating canals, of equal lengths, the water in both would be in equilibrio, because each column would exert the same total pressure at O. But if the gravitation of each particle in *p* O be diminished by a certain proportion, such as $\frac{1}{100}$ th of its whole weight, it is plain that the total pressure of the column *p* O will be $\frac{1}{100}$ th part less than that of the column EO. Therefore they will no longer be in equilibrio. The weight of the column EO will prevail; and if a hollow tower Pp be built at the mouth of the pit *p* o, the water will sink in EO and rise in Op, till both are again in equilibrio, exerting equal total pressures at O. Or we may prevent the sinking at E by pouring in more water into the tower Pp. The same thing must happen in the canal *sc* perpendicular to EO, if the gravitation of every

particle be diminished by a force acting in the direction CF, and proportional to the distance of the particle from C, and such, that when *c* C is equal to *o* O, the force acting on *c* is equal to the force acting on *o*. In order that the former equilibrium may be restored after this diminution of the gravitation of the column *sc*, it is plain that more water must be poured into the oblique tower Ff. All this is evident when we consider the matter hydrostatically. The gravitation of the particle *c* may be represented by *o* O; but the diminution of the pressure occasioned by this at O is represented by Cc.

Hence we can collect this much, that the whole diminution of pressure at C is to the whole diminution of pressure at O as the sum of all the lines *c* C to the sum of all the lines *o* O, that is, as fC^2 to pO^2 . But the weight of the small quantity of water added in each tower is diminished in the same proportion; therefore the quantity added at Ff must be to the quantity added at Pp as *f* C to *p* O. Therefore we must have $Ff : Pp = fC : pO$, and the points E, F, P, must be in the circumference of an ellipse, of which PO and EO are the transverse and conjugate semiaxes.

What we have here supposed concerning the diminution of gravity in these canals is a thing which really obtains in nature. It was demonstrated, when treating of the *PRECESION of the Equinoxes*, that if the sun or moon lie in the direction OP, at a very great distance, there results from the unequal gravitation of the different particles of the earth a diminution of the gravity of each particle; which diminution is in a direction parallel to OP, and proportional to the distance of the particle from a plane passing through the centre of the earth at right angles to the line OP.

Thus it happens that the waters of the ocean have their equilibrium disturbed by the unequal gravitation of their different particles to the sun or to the moon; and this equilibrium cannot be restored till the waters come in from all hands, and rise up around the line joining the centres of the earth and of the luminary. The spherical ocean must acquire the form of a prolate spheroid generated by the revolution of an ellipse round its transverse axis. The waters will be highest in that place which has the luminary in its zenith, and in the antipodes to that place; and they will be most depressed in all those places which have the luminary in their horizon. P and P' will be the poles, and EOQ will be the equator of this prolate spheroid.

Mr Ferguson, in his *Astronomy*, assigns another cause of this arrangement, viz. the difference of the centrifugal forces of the different particles of water, while the earth is turning round the common centre of gravity of the earth and moon. This, however, is a mistake. It would be just if the earth and moon were attached to the ends of a rod, and the earth kept always the same face toward the moon.

It is evident that the accumulation at P and P', and the depression at the equator, must augment and diminish in the same proportion with the disturbing force. It is also evident that its absolute quantity may be discovered by our knowledge of the proportion of the disturbing force to the force of gravity.—Now this proportion is known; for the proportion of the gravitation of the earth's centre to the sun or moon, to the force of gravity at the earth's surface, is known; and the proportion of the gravitation of the earth's centre to the luminary, to the difference of the gravitations of the centre and of the surface, is also known, being very nearly the proportion of the distance of the luminary to twice the radius of the earth.

Although this reasoning, by which we have ascertained the elliptical form of the watery spheroid, be sufficiently convincing, it is very imperfect, being accommodated to one condition only of equilibrium, viz. the equilibrium of the

Tide. canals fc and co . There are several other conditions equally necessary to which this lax reasoning will not apply, such as the direction of the whole remaining gravitation in any point F . This must be perpendicular to the surface, &c. &c. Nor will this mode of investigation ascertain the eccentricity of the spheroid without a most intricate process. We must therefore take the subject more generally, and show the proportion and directions of gravity in every point of the spheroid. We need not, however, again demonstrate that the gravitation of a particle placed any where without a perfect spherical shell, or a sphere consisting of concentric spherical shells, either of uniform density, or of densities varying according to some function of the radius, is the same as if the whole matter of the shell or sphere were collected in the centre. This has been demonstrated in the article ASTRONOMY. We need only remind the reader of some consequences of this theorem which are of continual use in the present investigation.

1st, The gravitation to a sphere is proportional to its quantity of matter directly, and to the square of the distance of its centre from the gravitating particle inversely.

2^d, If the spheres be homogeneous and of the same density, the gravitations of particles placed on their surfaces, or at distances which are proportional to their diameters, are as the radii; for the quantities of matter are as the cubes of the radii, and the attractions are inversely as the squares of the radii; and therefore the whole gravitations are as $\frac{r^3}{r^2}$, or as r .

3^d, A particle placed within a sphere has no tendency to the matter of the shell which lies without it, because its tendency to any part is balanced by an opposite tendency to the opposite part. Therefore,

4th, A particle placed any where within a homogeneous sphere gravitates to its centre with a force proportional to its distance from it.

It is a much more difficult problem to determine the gravitation of particles to a spheroid. To do this in general terms, and for every situation of the particle, would require a train of propositions which our limits will by no means admit; we must content ourselves with as much as is necessary for merely ascertaining the ratio of the axes. This will be obtained by knowing the ratio of the gravitation at the pole to that at the equator. Therefore

Let $NmSqN$ (fig. 2) be a section through the axis of an oblate homogeneous spheroid, which differs very little from a sphere. NS is the axis, mQ is the equatorial diameter, O is the centre, and $NMSQ$ is the section of the inscribed sphere. Let P be a particle situated at any distance without the sphere in its axis produced; it is required to determine the gravitation of this particle to the whole matter of the spheroid?

Draw two lines PAC , PBD , very near to each other, cutting off two small arches AB , CD ; draw GAa , HBb , ICc , KDd , perpendicular to the axis; also draw OE and AL perpendicular to PAC , and OF perpendicular to PD , cutting PC in f . Join OA .

Let OA , the radius of the inscribed sphere, be r , and OP the distance of the gravitating particle be d , and Mm , the elevation of the equator of the spheroid, or the ellipticity, be e . Also make $AE = x$, and $OE = y$, $= \sqrt{r^2 - x^2}$.

Then $AE - BF = x$ and $Ff = y$, $= \frac{x \cdot x}{\sqrt{r^2 - x^2}}$.

Suppose the whole figure to turn round the axis OP . The little space $ABba$ will generate a ring of the redundant matter; so will $CDdc$. This ring may be consider-

ed as consisting of a number of thin rings generated by the revolution of Aa . The ring generated by Aa is equal to a parallelogram whose base is the circumference described by A and whose height is Aa . Therefore let c be the circumference of a circle whose radius is 1. The ring will be $Aa \times c \times AG$. But because maN is an arch of an ellipse, we have $Mm : Aa = MO : AG = r : AG$, and $Aa = Mm \times \frac{AG}{r} = \frac{e}{r} AG$. Therefore the surface of this ring is $= c \frac{e}{r} AG^2$.

We have supposed the spheroid to be very nearly spherical, that is, e exceedingly small in comparison of r . This being the case, all the particles in Aa , and consequently all the particles in the ring generated by the revolution of Aa , will attract the remote particle P with the same force that A does very nearly. We may say the same thing of the whole matter of the ring generated by the revolution of $ABba$. This attraction is exerted in the direction PA by each individual particle. But every action of a particle A is accompanied by the action of a particle A' in the direction PA' . These two compose an attraction in the direction PO . The whole attraction in the directions similar to PA is $= c \times \frac{e}{r} \frac{AG^2}{PA^2} \times GH$, for GH measures the number of parallel plates of which the solid ring is composed.

This being decomposed in the direction PG is $= c \times \frac{e}{r} \times \frac{AG^2 \cdot PG}{PA^3} \times GH$. But $\frac{AG^2}{PA^2} = \frac{OE^2}{PO^2}$, and $\frac{PG}{PA} = \frac{PE}{PO}$. Therefore the attraction of the ring, estimated in the direction PO , is $= c \times \frac{e}{r} \times \frac{OE^2 \cdot PE}{PO^3} \times GH$.

Farther, by the nature of the circle, we have $HG : AB = AG : AO$; also $AB : BL = AO : OE$. But $PA : AG = PO : OE$, and $OE = \frac{AG \times PO}{PA}$. Therefore

$AB : BL = AO : \frac{AG \cdot PO}{PA} = AO \cdot PA : PO \cdot AG$
Also $BL : LA = EO : EA$,
And $LA : Ff = PA : Pf$, $=$ ultimately $PA : PE$. Therefore, by equality, $HG : Ff = AG \cdot AO \cdot PA \cdot EO \cdot PA : AO \cdot PO \cdot AG \cdot EA \cdot PE$.
Or $HG : Ff = EO \cdot PA^2 : PO \cdot EA \cdot PE$.
And $HG = Ff \times \frac{EO \cdot PA^2}{PO \cdot PE \cdot EA}$.

Now substitute this value of HG in the formula expressing the attraction of the ring. This changes it to $c \frac{e}{r} \times \frac{OE^2 \cdot PE}{PO^3} \times \frac{OE \cdot PA^2}{PO \cdot PE \cdot EA} \times Ff$, or $c \frac{e}{r} \times \frac{OE^3 \cdot PA^2}{PO^4 \cdot EA} \times Ff$. In like manner, the attraction of the ring generated by the revolution of $CDdc$ is $c \frac{e}{r} \times \frac{OE^3 \cdot PC^2}{PO^4 \cdot EA} \times Ff$. Therefore the attraction of both is $= c \frac{e}{r} \times Ff \times \frac{OE^3}{PO^4 \cdot EA} \times \overline{PA^2 + PC^2}$, $= c \frac{e}{r} \times Ff \times \frac{y^3}{d^4 \cdot x} \times \overline{PA^2 + PC^2}$. But $PA^2 + PC^2 = 2PE^2 + 2EA^2 = 2PE^2 + 2x^2$. Therefore the attraction is $2c \frac{e}{r d^4} \times Ff \times \frac{y^3}{x} \times \overline{PE^2 + x^2}$. But $Ff = y$, $= \frac{x}{y} \cdot x$. Therefore $Ff \frac{y^3}{x} = \frac{x}{y} \cdot x \times \frac{y^3}{x} = y^2 x$, $=$

Tide. $= \overline{r^2 - x^2}$. Therefore the attraction of the two rings is $2c \frac{e}{r d^4} \times r^2 - x^2 \times \overline{PE^2 + x^2} \times \dot{x}$. But $PE^2 = PO^2 - OE^2 = d^2 - (r^2 - x^2) = d^2 - r^2 + x^2$. Therefore the attraction of the two rings is

$$2c \frac{e}{r d^4} \times r^2 - x^2 \times d^2 - r^2 + 2x^2 \dot{x} = 2c \frac{e}{r d^4} \times$$

$$r^2 d^2 \dot{x} - r^4 \dot{x} + 2r^2 x^2 \dot{x} - d^2 x^2 \dot{x} + r^2 x^2 \dot{x} - 2x^4 \dot{x} = 2c \frac{e}{r d^4}$$

$$\times r^2 d^2 \dot{x} + 3r^2 x^2 \dot{x} - r^4 \dot{x} - d^2 x^2 \dot{x} - 2x^4 \dot{x}.$$

The attraction of the whole shell of redundant matter will be had by taking the fluent of this formula, which is $2c \frac{e}{r d^4} \times \left(r^2 d^2 x + \frac{3r^2 x^3}{3} - r^4 x - \frac{d^2 x^3}{3} - \frac{2x^5}{5} \right)$,

and then make $x=r$. This gives $2c \frac{e}{r d^4} (d^2 r^3 + r^5 - r^5 - \frac{1}{3} d^2 r^3 - \frac{2}{5} r^5)$, which is $= 2c \frac{e}{r d^4} (\frac{2}{3} d^2 r^3 - \frac{2}{5} r^5)$, $= \frac{4ce r^2}{3 d^4} - \frac{4r^4}{5 d^4}$. To this add the attraction of the in-

scribed sphere, which is $\frac{2}{3} \frac{c r^3}{d^2}$, and we have the attraction of the whole spheroid

$$= \frac{2}{3} \frac{c r^3}{d^2} + \frac{4}{3} \frac{c e r^2}{d^2} - \frac{4}{5} \frac{c e r^4}{d^4}$$

Cor. 1. If the particle P is situated precisely in N, the pole of the spheroid, the attraction of the spheroid, is $\frac{2}{3} c r + \frac{8}{15} c e$.

If the spheroid is not oblate, but oblong, and if the greater semiaxis be r , and the depression at the equator be e , the analysis is the same, taking e negatively. Therefore the attraction for a particle in the pole, or the gravitation of a particle in the pole, is $\frac{2}{3} c r - \frac{8}{15} c e$.

But if the polar semiaxis be $r + e$, and the equatorial radius be r , so that this oblong spheroid has the same axis with the former oblate one, the gravitation of a particle in the pole is $\frac{2}{3} c r + \frac{8}{15} c e$.

Cor. 2. If a number of parallel planes are drawn perpendicular to the equator of an oblong spheroid, whose longer semiaxis is $r + e$, and equatorial radius r , they will divide the spheroid into a number of similar ellipses; and since the ellipse through the axis has $r + e$ and r for its two semiaxes, and the radius of a circle of equal area with this ellipse is a mean proportional between r and $r + e$, and therefore very nearly $= r + \frac{1}{2} e$, when e is very small in comparison of r , a particle on the equator of the oblong spheroid will be as much attracted by these circles of equal areas, with their corresponding ellipses, as by the ellipses. Now the attraction at the pole of an oblate spheroid was $\frac{2}{3} c r + \frac{8}{15} c e$. Therefore putting $\frac{1}{2} e$ in place of e , the attraction on the equator of the oblong spheroid will be equal to $\frac{2}{3} c r + \frac{4}{15} c e$.

Thus we have ascertained the gravitations of a particle situated in the pole, and of one situated in the equator, of a homogeneous oblong spheroid. This will enable us to solve the following problem:

If the particles of a homogeneous oblong fluid spheroid attract each other with a force inversely as the squares of their distances, and if they are attracted by a very distant body by the same law, and if the ratio of the equatorial gravity to this external force be given; to find what must be the proportion of the semiaxis, so that all may be in equilibrium, and the spheroid preserve its form?

Let r be the equatorial radius, and $r + e$ be the polar semiaxis. Then the gravitation at the pole m is $\frac{2}{3} c r + \frac{8}{15} c e$,

and the gravitation at the equator is $\frac{2}{3} c r + \frac{4}{15} c e$. Tide. Now by the gravitation towards the distant body placed in the direction of the polar axis, the polar gravitation is diminished, and the equatorial gravitation is increased; and the increase of the equatorial gravitation is to the diminution of the polar gravitation as NO to 2 m O. Therefore if the whole attraction of the oblong spheroid for a particle on its equator be to the force which the distant body exerts there, as G to P, and if the spheroid is very nearly spherical, the absolute weight at the equator will be $\frac{2}{3} c r + \frac{4}{15} c e + \frac{2}{3} c r \frac{P}{G}$. And the absolute weight at the pole will

be $\frac{2}{3} c r + \frac{8}{15} c e - \frac{2}{3} c r \frac{2P}{G}$. Their difference is $\frac{8}{15} c e + 2 c r \frac{P}{G}$.

Now if we suppose this spheroid to be composed of similar concentric shells, all the forces will decrease in the same ratio. Therefore the weight of a particle in a column reaching from the equator to the centre will be to the weight of a similarly situated particle of a column reaching from the pole to the centre, as the weight of a particle at the equator to the weight of a particle at the pole. But the whole weights of the two columns must be equal, that they may balance each other at the centre. Their lengths must therefore be reciprocally as the weights of similarly situated particles; that is, the polar semiaxis must be to the equatorial radius, as the weight of a particle at the equator to the weight of a particle at the pole. Therefore we must have $\frac{2}{3} c e + 2 c r \frac{P}{G} : \frac{2}{3} c r + \frac{8}{15} c e - \frac{4}{3} c r \frac{P}{G} = e : r$.

Hence we derive $2 r \frac{P}{G} = \frac{8}{15} e$, or $4 G : 15 P = r : e$. This determines the form of the fluid spheroid when the ratio of G to P is given.

It is well known that the gravitation of the moon to the earth is to the disturbing force of the sun as 178,725 to 1 very nearly. The lunar gravitation is increased as she approaches the earth in the reciprocal duplicate ratio of the distances. The disturbing force of the sun diminishes in the simple ratio of the distances; therefore the weight of a body on the surface of the earth is to the disturbing force of the sun on the same body, in a ratio compounded of the ratio of 178,725 to 1, the ratio of 3600 to 1, and the ratio of 60 to 1; that is, in the ratio of 38604600 to 1. If the mean radius of the earth be 20934500 feet, the difference of the axis, or the elevation of the pole of the watery spheroid produced by the gravitation to the sun, will be $\frac{1}{2} \times \frac{20934500}{38604600} = 24\frac{1}{2}$ inches. This is the tide produced by the sun on a homogeneous fluid sphere.

* It is plain, that if the earth consists of a solid nucleus of the same density with the water, the form of the solar tide will be the same. But if the density of the nucleus be different, the form of the tide will be different, and will depend both on the density and on the figure of the nucleus.

If the nucleus be of the same form as the surrounding fluid, the whole will still maintain its form with the same proportion of the axis. If the nucleus be spherical, its action on the surrounding fluid will be the same as if all the matter of the nucleus by which it exceeds an equal bulk of the fluid were collected at the centre. In this case, the ocean cannot maintain the same form: for the action of this central body being proportional to the square of the distance inversely, will augment the gravity of the equatorial fluid more than it augments that of the circumpolar fluid; and the ocean, which was in equilibrio (by supposition), must now become more protuberant at the poles. It may, however,

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ever, be again balanced in an elliptical form, when it has acquired a just proportion of the axes. The process for determining this is tedious, but precisely similar to the preceding.

If the density of the nucleus exceed that of the fluid about $\frac{1}{5\frac{1}{2}}$, we shall have $r : e = G : 3 P$, which is nearly the form which has been determined for the earth, by the mensuration of degrees of the meridian, and by the vibration of pendulums. The curious reader will do well to consult the excellent dissertations by Clairaut and Bosovich on the Figure of the Earth, where this curious problem is treated in the most complete manner. Mr Bernoulli, in his dissertation on the Tides, has committed a great mistake in this particular. On the other hand, if the nucleus be less dense than the waters, or if there be a great central hollow, the elevation produced by the sun will exceed $24\frac{1}{2}$ inches.

It is needless to examine this any farther. We have collected enough for explaining the chief affections of the tides.

It is known that the earth is not a sphere, but swelled out at the equator by the diurnal rotation. But the change of form is so very small in proportion to the whole bulk, that it cannot sensibly affect the change of form afterwards induced by the sun on the waters of the ocean. For the disturbing force of the sun would produce a certain protuberance on a fluid sphere; and this protuberance depends on the ratio of the disturbing force to the force of gravity at the surface of this sphere. If the gravity be changed in any proportion, the protuberance will change in the same proportion. Therefore if the body be a spheroid, the protuberance produced at any point by the sun will increase or diminish in the same proportion that the gravity at this point has been changed by the change of form. Now the change of gravity, even at the pole of the terrestrial spheroid, is extremely small in comparison with the whole gravity. Therefore the change produced on the spheroid will not sensibly differ from that produced on the sphere; and the elevations of the waters above the surface, which they would have assumed independent of the sun's action, will be the same on the spheroid as on the sphere. For the same reason, the moon will change the surface already changed by the sun, in the same manner as she would have changed the surface of the undisturbed ocean. Therefore the change produced by both these luminaries in any place will be the same when acting together as when acting separately; and it will be equal to the sum, or the difference of their separate changes, according as these would have been in the same or in opposite directions.

Let us now consider the most interesting circumstances of the form of an elliptical tide, which differs very little from a sphere.

Let T (fig. 2.) be a point in the surface of the inscribed sphere, and let Z express the angular distance TOQ from the longer axis of the surrounding spheroid $S m N q$. Let TR , TW be perpendicular to the equatorial diameter and to the axis, so that they are the cosine and the sine of TOQ to the radius TO or QO . Let $S' q N$ be a section of the circumscribed sphere. Draw OT cutting the spheroid in Z and the circumscribed sphere in t . Also let son be a section of a sphere which has the same capacity with the spheroid, and let it cut the radius in r . Then,

1. The elevation TZ of the point Z of the spheroid above the inscribed sphere is $= Qq \times \cos.^2 Z$, and the depression tZ below the circumscribed sphere is $= Qq \times \sin.^2 Z$. Produce RT till it meet the surface of the spheroid in V . The minute triangle VTZ may be considered as a rectilinear, right-angled at Z , and therefore similar to OTR .

Therefore $OT : TR = TV : TZ$. But in the ellipse QQ , or $OT : TR = Qq : TV$. Therefore $OT^2 : TR^2 = Qq : TZ$, and $TZ = \frac{Qq \cdot TR^2}{OT^2} = Qq : \frac{Qq \times \cos.^2 Z}{1} = Qq \times \cos.^2 Z$.

And in the very same manner it may be shown, that $tZ = Qq \times \sin.^2 Z$.

2. The elevation of the point T above another point T' , whose angular distance TOI' from the point T is 90° , is $= Qq \times \cos.^2 Z - \sin.^2 Z$. Call the angle $QOT' Z'$. Then $T'Z' = Qq \times \cos.^2 Z'$, and $TZ - T'Z' = Qq \times \cos.^2 Z - \cos.^2 Z'$. But the arch QT' is the complement of QI' , and therefore $\cos.^2 Z' = \sin.^2 Z$. Therefore $TZ - T'Z' = Qq \times \cos.^2 Z - \sin.^2 Z$.

3. $Qo = \frac{1}{3} Qq$. For the inscribed sphere is to the spheroid as OO to Oq . But the inscribed sphere is to the sphere son as OO^3 to Oo^3 . Therefore because the sphere son is equal to the spheroid $S q N$, we have $OO : Oq = OO^3 : Oo^3$, and Oo is the first of two mean proportionals between OO and Oq . But Qq is very small in comparison with OO . Therefore Qo is very nearly $\frac{1}{3}$ of Qq .

Since son is the sphere of equal capacity, it is the form of the undisturbed ocean. The best way therefore of conceiving the changes of form produced by the sun or moon, or by both together, is to consider the elevations or depressions which they produce above or below this surface. Therefore,

4. The elevation rZ of the point Z above the equicapacious sphere is evidently $= Qq \times \cos.^2 Z - \frac{1}{3} Qq$. Also the depression $r'Z'$ of the point Z' is $= Qq \times \sin.^2 Z' - \frac{1}{3} Qq$.

N. B. Either of these formulæ will answer for either the elevation above, or the depression below, the natural ocean: For if $\cos.^2 Z$ is less than $\frac{1}{3}$, the elevation given by the formula will be negative; that is, the point is below the natural surface. In like manner, when $\sin.^2 Z'$ is less than $\frac{1}{3}$, the depression is negative, and the point is above the surface. But if $\cos.^2 Z$ be $= \frac{1}{3}$, or $\sin.^2 Z'$ be $= \frac{1}{3}$, the point is in the natural surface. This marks the place where the spheroid and the equal sphere intersect each other, viz in P , the arch $P'o$ being $54^\circ 44'$ very nearly, and $PS = 35^\circ 16'$.

Let S represent the whole elevation of the pole of the solar tide above its equator, or the difference between high and low water produced by the sun; and let M represent the whole elevation produced by the moon. Let x and y represent the zenith distances of the sun and moon with respect to any point whatever on the ocean. Then x and y will be the arches intercepted between that point and the summits of the solar and lunar tides. Then the elevation produced by both luminaries in that plane is $S \cdot \cos.^2 x - \frac{1}{3} S + M \cdot \cos.^2 y - \frac{1}{3} M$; or, more concisely, $S \cdot \cos.^2 x + M \cdot \cos.^2 y - \frac{1}{3} S + M$, and the depression is $S \cdot \sin.^2 x + M \cdot \sin.^2 y - \frac{1}{3} S + M$.

Let the sun and moon be in the same point of the heavens. The solar and lunar tides will have the same axis; the cosines of x and y will each be 1, and the elevation at the compound pole will be $S + M - \frac{1}{3} S + M = \frac{2}{3} S + M$. The depression at any point 90° from this pole will be $\frac{1}{3} S + M$, and the whole tide is $S + M$.

Let the moon be in quadrature, as in a (fig. 3). The appearance at s will be known, by considering that in this place the cosine of x is 1, and the cosine of y is 0. Therefore the elevation at $s = S - \frac{1}{3} S + M = \frac{2}{3} S - \frac{1}{3} M$. The depression at $a = S - \frac{1}{3} S + M = \frac{2}{3} S - \frac{1}{3} M$. The difference or whole tide $= S - M$.

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Tide. In like manner, the whole elevation at a above the inscribed sphere is $M - S$.

Hence we see that the whole tide, when the moon is in quadrature, is the difference of S and M . We also see, that if M exceeds S , the water will be higher at a than at s . Now it is a matter of observation, that in the quadratures it is high water under the moon, and low water under the sun. It is also a matter of observation, that in the free ocean, the ebb tide, or the water at s , immediately under the sun, is below the natural surface of the ocean. Hence we must conclude, that $\frac{2}{3} S$ is less than $\frac{1}{3} M$, or that M is more than double of S . This agrees with the phenomena of nutation and precession, which seem to make $S = \frac{2}{3}$ of M .

In all other positions of the sun and moon, the place of high water will be different. It is high water where the sum of the elevations produced by both luminaries above the natural ocean is greatest; and the place of low water is where the depression below the natural ocean is greatest. Therefore, in order that it may be high water, we must have $S \cdot \cos^2 x + M \cdot \cos^2 y - \frac{1}{3} S + M$ a maximum; or, neglecting the constant quantity $\frac{S + M}{3}$, we must have $S \cdot \cos^2 x + M \cdot \cos^2 y$ a maximum.

In like manner, to have low water in a place where the zenith distances of the sun and moon are v and w , we must have $S \cdot \sin^2 v + M \cdot \sin^2 w$ a maximum.

Lemma 1. If we consider the sines and cosines of angles as numeral fractions of the radius 1, then we have $\cos^2 Z = \frac{1}{2} + \frac{1}{2} \cos^2 Z$, and $\sin^2 Z = \frac{1}{2} - \frac{1}{2} \cos^2 Z$.

Let ams (fig. 3.) be a quadrant of a circle of which O is the centre, and Os is the radius. On Os describe the semicircle OMS , cutting Om in M . Draw sM , and produce it till it cut the quadrant in n . Also draw MC to the centre of the semicircle, and MD and nd perpendicular to Os .

It is plain that sM is perpendicular to OM ; and if Os be radius, sM is the sine of the angle sOM , which we may call Z ; OM is its cosine: and because $Os : OM = OM : OD$, and $Os : OD = Os^2 : OM^2$, and OD may represent $\cos^2 Z$. Now $OD = OC + CD$. If $Os = 1$, then $OC = \frac{1}{2}$. $CD = CM \cdot \cos^2 MCD = CM \cdot \cos^2 2MOD = \frac{1}{2} \cdot \cos^2 2Z$. Therefore $\cos^2 Z = \frac{1}{2} + \frac{1}{2} \cos^2 2Z$.

In like manner, because $Os : sM = sM : sD$, sD is $\sin^2 Z$. This is evidently $\frac{1}{2} - \frac{1}{2} \cos^2 2Z$.

Lemma 2. $\cos^2 Z - \sin^2 Z = \cos^2 2Z$. For, because sM is perpendicular to OM , the arch sn is double of the arch sm , and because MD is parallel to nd , sd is $= 2sD$, and $dD = \sin^2 Z$. Therefore $Od = \cos^2 Z - \sin^2 Z$. But Od is the cosine of ns , $= \cos^2 2Z$, and $\cos^2 Z - \sin^2 Z = \cos^2 2Z$.

By the first Lemma we see, that in order that there may be high water at any place, when the zenith distances of the sun and moon are x and y , we must have $S \cdot \cos^2 x + M \cdot \cos^2 y$ a maximum.

That this may be the case, the fluxion of this formula must be $= 0$. Now we know that the fluxions of the cosines of two arches are as the sines of those arches. Therefore we must have $S \cdot \sin 2x + M \cdot \sin 2y = 0$, or $S \cdot \sin 2x = -M \cdot \sin 2y$, which gives us $\sin 2x : \sin 2y = M : S$.

In like manner, the place of low water requires $\sin 2v : \sin 2w = M : S$.

From this last circumstance we learn, that the place of low water is o , removed 90° from the place of high water; whereas we might have expected, that the spheroid would have been most protuberant on that side on which the moon is: For the sines of $2v$ and of $2w$ have the same proportion with the sines of $2x$ and of $2y$. Now we know that

the sine of the double of any arch is the same with the sine of the double of its complement. Therefore if low water be really distant 90° from high water, we shall have $\sin 2x : \sin 2y = \sin 2v : \sin 2w$. But if it is at any other place, the sines cannot have this proportion.

Now let s be the point of the earth's surface which has the sun in the zenith, and m the point which has the moon in the zenith. Let b be any other point. Draw Ob cutting the semicircle OMS in H . Make CM to CS as the disturbing force of the moon to that of the sun; and draw Sv parallel, and St , Mr perpendicular to HH' . Join MH and MH' . The angle HCs is double of the angle HOs , and MCH is double of $MH'H$, or of its equal MOH . Because HMH is a semicircle, HM is perpendicular to MO . Therefore if HH' be considered as radius, HM is the sine, and $H'M$ is the cosine of $MH'H$. And Cr is $= MC \cdot \cos 2y = M \cdot \cos 2y$. And Ct is $SC \cdot \cos 2x$. Therefore tr or $S'v$ is $= S \cdot \cos 2x + M \cdot \cos 2y$. Therefore tr or Sv will express the whole difference of elevation between b and the points that are 90° degrees from it on either side (by Lemma 2.); and if b be the place of high water, it will express the whole tide, because the high and low waters were shown to be 90° asunder. But when b is the place of high water, Sv is a maximum. Because the place of the moon, and therefore the point M , is given, Sv will be a maximum when it coincides with SM , and CH is parallel to SM .

This suggested to us the following new, and not inelegant, solution of the problem for determining the place of high water.

Let $sQqs$ (fig. 4. and 5.) be a section of the terra-queous globe, by a plane passing through the sun and moon, and let O be its centre. Let s be the point which is immediately under the sun, and m the place immediately under the moon. Bisect Os in C , and describe round C the circle $OMsLO$, cutting Om in M . Take Cs to represent the disturbing force of the moon, and make Cs to CS as the force of the moon to that of the sun (supposing this ratio to be known). Join MS , and draw CH parallel to it. Draw OHb , and LOL' perpendicular to it. And lastly, draw CI perpendicular to SM . Then we say that m and its opposite m' are the places of high water, l and l' are the places of low water, MS is the height of the tide, and MI , SI are the portions of this tide produced by the moon and sun.

For it is plain, that in this case the line Sv of the last proposition coincides with MS , and is a maximum. We may also observe, that $MC : CS = \sin MSC : \sin SMC = \sin HCS : \sin MCH = \sin 2bOs : \sin 2bOm = \sin 2x : \sin 2y$, or $M : S = \sin 2x : \sin 2y$, agreeably to what was required for the maximum.

It is also evident, that $MI = MC \cdot \cos CMI = M \cdot \cos 2y$, and $SI = SC \cdot \cos ISC = S \cdot \cos 2x$; and therefore MS is the difference of elevation between b and the points l and l' , which are 90° from it, and is therefore the place of low water; that is, MS is the whole tide.

The elevation of every other point may be determined in the same way, and thus may the form of the spheroid be completely determined.

If we suppose the figure to represent a section through the earth's equator (which is the case when the sun and moon are in the equator), and farther suppose the two luminaries to be in conjunction, the ocean is an oblong spheroid, whose axis is in the line of the syzgies, and whose equator coincides with the six hour circle. But if the moon be in any other point of the equator, the figure of the ocean will be very complicated. It will not be any figure of revolution; because neither its equator (or most depressed part),

Tide. part), nor its meridians, are circles. The most depressed part of its equator will be in that section through the axis which is perpendicular to the plane in which the luminaries are situated. And this greatest depression, and its shortest equatorial diameter, will be constant, while its other dimensions vary with the moon's place. We need not inquire more minutely into its form; and it is sufficient to know, that all the sections perpendicular to the plane passing thro' the sun and moon are ellipses.

This construction will afford us a very simple, and, we hope, a very perspicuous explanation of the chief phenomena of the tides. The well informed reader will be pleased with observing its coincidence with the algebraic solution of the problem given by Daniel Bernoulli, in his excellent dissertation on the Tides, which shared with M'Laurin and Euler the prize given by the Academy of Sciences at Paris, and with the ease and perspicuity with which the phenomena are deducible from it, being in some sort exhibited to the eye.

In our application, we shall begin with the simplest cases, and gradually introduce the complicating circumstances which accommodate the theory to the true state of things.

We begin, therefore, by supposing the earth covered, to a proper depth, with water, forming an ocean concentric with its solid nucleus.

In the next place, we suppose that this ocean adopts in an instant the form which is consistent with the equilibrium of gravity and the disturbing forces.

Thirdly, We suppose the sun stationary, and the moon to move eastward from him above $12\frac{1}{2}^{\circ}$ every day.

Fourthly, We suppose that the solid nucleus turns round its proper axis to the eastward, making a rotation in 24 solar hours. Thus any place of observation will successively experience all the different depths of water.

Thus we shall obtain a certain SUCCESSION of phenomena, precisely similar to the succession observed in nature, with this sole difference, that they do not correspond to the contemporaneous situations of the sun and moon. When we shall have accounted for this difference, we shall presume to think that we have given a just theory of the tides.

We begin with the simplest case, supposing the sun and moon to be always in the equator. Let the series begin with the sun and moon in conjunction in the line Os . In this case the points s , m , and b coincide, and we have high water at 12 o'clock noon and midnight.

While the moon moves from s to Q , Om cuts the upper semicircle in M ; and therefore CH , which is always parallel to MS , lies between MC and Cs . Therefore b is between m and s , and we have high water after 12 o'clock, but before the moon's southing. The same thing happens while the moon moves from o to q , during her third quarter.

But while the moon moves from her first quadrature in Q to opposition in o (as in fig. 5.), the line mO drawn from the moon's place, cuts the lower semicircle in M and CH , parallel to SM , again lies between M and s , and therefore b lies between m and o . The place of high water is to the eastward of the moon, and we have high water after the moon's southing. The same thing happens while the moon is moving from her last quadrature in q to the next syzygy. In short, the point H is always between M and s , and the place of high water is always between the moon and the nearest syzygy. The place of high water overtakes the moon in each quadrature, and is overtaken by the moon in each syzygy. Therefore during the first and third quarters, the place of high water gradually falls behind the moon for some time, and then gains upon her

again, so as to overtake her in the next quadrature. But during the second and fourth quarters, the place of high water advances before the moon to a certain distance, and then the moon gains upon it, and overtakes it in the next syzygy.

If therefore we suppose the moon to advance uniformly along the equator, the place of high water moves unequally, slowest in the times of new and full moon, and swiftest in the time of the quadratures. There must be some intermediate situations where the place of high water neither gains nor loses upon the moon, but moves with the same velocity.

The rate of motion of the point b may be determined as follows: Draw Ci , Sn , making very small and equal angles with HC and MS . Draw nC , and about S , with the distance Sn , describe the arch nv , which may be considered as a straight line perpendicular to nS , or to MS .

Then, because SM and Sn are parallel to CH and Ci , the points n and i are contemporaneous situations of M and H , and the arches nM , iH , are in the ratio of the angular motions of m and b . Also, because nv and nM are perpendicular to nS and nC , the angle vnM is equal to the angle SnC , or SMC . Also, because the angles nvM and MIC are right angles, and the angles vnM , CMI , are also equal, the triangles vnM , CMI , are similar. Therefore

$$nM : nv = MC : MI. \text{ And}$$

$$nv : iH = nS : iC, \text{ or } = MS : MC; \text{ therefore}$$

$nM : iH = MS : MI$. Therefore the angular motion of the moon is to the angular motion of the place of high water as MS to MI .

Therefore, when MS is perpendicular to SC , and the point I coincides with S , the motion of high water is equal to that of the moon. But when MS is perpendicular SC , HC is also perpendicular to Cs , and the angle HOs is 45° , and the high water is in the octant. While the moon passes from s to m' , or the high water from s to b' , the point I falls between M and S , and the motion of high water is slower than that of the moon. The contrary obtains while the moon moves from m' to Q , or the high water from the octant to the quadrature.

It is evident, that the motion of b in the third quarter of the lunation, that is, in passing from o to q , is similar to its motion from s to Q . Also, that its motion from Q to o must retard by the same degrees as it accelerated in passing from s to Q , and that its motion in the last quarter from q to s is similar to its motion from Q to o .

At new and full moon the point I coincides with C , and the point M coincides with s . Therefore the motion of the high water at full and change is to the motion of the moon as sC to sS . But when the moon is in quadrature, I coincides with C , and M with o . Therefore the motion of the moon is to that of high water as OS to OC or sC . Therefore the motion of high water at full and change is to its motion in the quadratures as OS to Ss , or as the difference of the disturbing forces to their sum. The motion of the tide is therefore slowest in the syzigies and swiftest in the quadratures; yet even in the syzigies it passes the sun along with the moon, but more slowly.

Let the interval between the morning tide of one day and that of the next day be called a *tide-day*. This is always greater than a solar day, or 24 hours, because the place of high water is moving faster to the eastward than the sun. It is less than a lunar day, or 24h. 50', while the high water passes from the second to the third octant, or from the fourth to the first. It is equal to a lunar day when high water is in the octants, and it exceeds a lunar day while high water passes from the first to the second octant, or from the third to the fourth.

The difference between a solar day and a tide day is called,

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called the PRIMING or the RETARDATION of the tides. This is evidently equal to the time of the earth's describing in its rotation an angle equal to the motion of the high water in a day from the sun. The smallest of these retardations is to the greatest as the difference of the disturbing forces to their sum. Of all the phenomena of the tides, this seems liable to the fewest and most inconsiderable derangements from local and accidental circumstances. It therefore affords the best means for determining the proportion of the disturbing forces. By a comparison of a great number of observations made by Dr Maskelyne at St Helena and at Barbadoes (places situated in the open sea), it appears that the shortest tide-day is 24h. 37', and the longest is 25h. 27'. This gives $M - S : M + S = 37 : 87$, and $S : M = 2 : 4.96$; which differs only 1 part in 124 from the proportion of 2 to 5, which Daniel Bernoulli collected from a variety of different observations. We shall therefore adopt the proportion of 2 to 5 as abundantly exact. It also agrees exactly with the phenomena of the nutation of the earth's axis and the precession of the equinoxes; and the astronomers affect to have deduced this proportion from these phenomena. But an intelligent reader of their writings will perceive more finess than justice in this assertion. The nutation and precession do not afford phenomena of which we can assign the share to each luminary with sufficient precision for determining the proportion of their disturbing forces; and it is by means of many arbitrary combinations, and without necessity, that D'Alembert has made out this ratio. We cannot help being of opinion, that D'Alembert has accommodated his distribution of the phenomena to this ratio of 2 to 5, which Daniel Bernoulli (the best philosopher and the most candid man of that illustrious family of mathematicians) had, with so much sagacity and justness of inference, deduced from the phenomena of the tides. D'Alembert could not but see the value of this inference; but he wanted to show his own address in deducing it *proprio Marte* forsooth from the nutation and precession. His procedure in this resembles that of his no less vain countryman De la Place, who affects to be highly pleased with finding that Mr Bode's discovery, that Meyer had seen the Georgium Sidus in 1756, perfectly agreed with the theory of its motions which he (De la Place) had deduced from his own doctrines. Any well informed mathematician will see, that De la Place's data afforded no such precision; and the book on the Elliptical Motions of the Planets, to which he alludes, contains no grounds for his inference. This observation we owe to the author of a paper on that subject in the Transactions of the Royal Society of Edinburgh. We hope that our readers will excuse this occasional observation, by which we wish to do justice to the merit of a modest man, and one of the greatest philosophers of his time. Our only claim in the present dissertation is the making his excellent performance on the tides accessible to an English reader not much variant in mathematical researches; and we are sorry that our limits do not admit any thing more than a sketch of it. But to proceed.

Assuming 2 : 5 as the ratio of SC to CM, we have the angle $CM'S = 23^\circ 34'$ nearly, and $m'o'b' = 11^\circ 47'$; and this is the greatest difference between the moon's place and the place of high water. And when this obtains, the moon's elongation $m'o's$ is $56^\circ 47'$ from the nearest syzgy. Hence it follows, that while the moon moves uniformly from $56^\circ 47'$ west elongation to $56^\circ 47'$ east, or from $123^\circ 13'$ east to $123^\circ 13'$ west, the tide day is shorter than the lunar day; and while she moves from $56^\circ 47'$ east to $123^\circ 13'$, or from $123^\circ 13'$ west to $56^\circ 47'$, the tide-day is longer than the lunar-day.

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We now see the reason why

— The swelling tides obey the moon.

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The time of high water, when the sun and moon are in the equator, is never more than 47 minutes different from that of the moon's southing (+ or — a certain fixed quantity, to be determined once for all by observation.)

It is now an easy matter to determine the hour of high water corresponding to any position of the sun and moon in the equator. Suppose that on the noon of a certain day the moon's distance from the sun is ms . The construction of this problem gives us sb , and the length of the tide day. Call this T . Then say $360^\circ : sm = T : t$, and t is the hour of high water.

Or, if we choose to refer the time of high water to the moon's southing, we must find the value of mb at the time of the moon's southing, and the difference d between the tide day and a mean lunar day L , and say $360 : mb = d : t$, the time of high water before the moon's southing in the first and third quarters, but after it in the second and fourth. The following table by Daniel Bernoulli exhibits these times for every 10th degree of the moon's elongation from the sun. The first or leading column is the moon's elongation from the sun or from the point of opposition. The second column is the minutes of time between the moon's southing and the place of high water. The marks — and + distinguish whether the high water is before or after the moon's southing. The third column is the hour and minute of high water. But we must remark, that the first column exhibits the elongation, not on the noon of any day, but at the very time of high water. The two remaining columns express the heights of the tides and their daily variations.

ms	mb	sb	MS	Mv
0	—	0.0	1000	13
10	11½ —	0.28½	987	38
20	22 —	0.58	949	62
30	31½ —	1.28½	887	81
40	40 —	2. —	806	91
50	45 —	2.35	715	105
60	46½ —	3.13½	610	92
70	40½ —	3.59½	518	65
80	25 —	4.55	453	24
90	0	6. —	429	—
100	+	7. 5	453	24
110	40½ +	8. 0½	518	65
120	46½ +	8.46½	610	92
130	45 +	9.25	715	105
140	40 +	10. —	806	91
150	31½ +	10.31½	887	81
160	22 +	11. 2	949	62
170	11½ +	11.31½	987	38
180	0	12. —	1000	13

The height of high water above the low water constitutes what is usually called the tide. This is the interesting circumstance in practice. Many circumstances render it almost impossible to say what is the elevation of high water above the natural surface of the ocean. In many places the surface at low water is above the natural surface of the ocean. This is the case in rivers at a great distance from their

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their mouths. This may appear absurd, and is certainly very paradoxical; but it is a fact established on the most unexceptionable authority. One instance fell under our own observation. The low water mark at spring tide in the harbour of Alloa was found by accurate levelling to be three feet higher than the top of the stone pier at Leith, which is several feet above the high water mark of this harbour. A little attention to the motion of running waters will explain this completely. Whatever checks the motion of water in a canal must raise its surface. Water in a canal runs only in consequence of the declivity of this surface: (See RIVER). Therefore a flood tide coming to the mouth of a river checks the current of its waters, and they accumulate at the mouth. This checks the current farther up, and therefore the waters accumulate there also; and this checking of the stream, and consequent rising of the waters, is gradually communicated up the river to a great distance. The water rises everywhere, though its surface still has a slope. In the mean time, the flood tide at the mouth passes by, and an ebb succeeds. This must accelerate even the ordinary course of the river. It will more remarkably accelerate the river now raised above its ordinary level, because the declivity at the mouth will be so much greater. Therefore the waters near the mouth, by accelerating, will sink in their channel, and increase the declivity of the canal beyond them. This will accelerate the waters beyond them; and thus a stream more rapid than ordinary will be produced along the whole river, and the waters will sink below their ordinary level. Thus there will be an ebb below the ordinary surface as well as a flood above it, however sloping that surface may be.

Hence it follows, that we cannot tell what is the natural surface of the ocean by any observations made in a river, even though near its mouth. Yet even in rivers we have regular tides, subjected to all the varieties deduced from this theory.

We have seen that the tide is always proportional to MS. It is greatest therefore when the moon is in conjunction or opposition, being then S_s , the sum of the separate tides produced by the sun and moon. It gradually decreases as the moon approaches to quadrature; and when she is at Q or q, it is SO, or the difference of the separate tides. Supposing S_s divided into 1000 equal parts, the length of MS is expressed in these parts in the fourth column of the foregoing table, and their differences are expressed in the fifth column.

We may here observe, that the variations of the tides in equal small times are proportional to the sine of twice the distance of the place of high water from the moon. For since Mn is a constant quantity, on the supposition of the moon's uniform motion, Mv is proportional to the variation of MS. Now $Mn : Mv = MC : CI = 1 : \sin. 2y$, and Mn and MC are constant quantities.

Thus we have seen with what ease the geometrical construction of this problem not only explains all the interesting circumstances of the tides, but also points them out, almost without employing the judgment, and exhibits to the eye the gradual progress of each phenomenon. In these respects it has great advantages over the very elegant algebraic analysis of Mr Bernoulli. In that process we advance almost without ideas, and obtain our solutions as detached facts, without perceiving their regular series. This is the usual pre-eminence of geometrical analysis; and we regret that Mr Bernoulli, who was eminent in this branch, did not rather employ it. We doubt not but that he would have shown still more clearly the connection and gradual progress of every particular. His aim, however, being to instruct those who were to calculate tables of the different affections

of the tides, he adhered to the algebraic method. Unfortunately it did not present him with the easiest formulæ for practice. But the geometrical construction which we have given suggests several formulæ which are exceedingly simple, and afford a very ready mode of calculation.

The fundamental problems are to determine the angle SOB or MOB , having MOs given; and to determine MS.

Let the given angle MOs be called a ; and, to avoid the ambiguity of algebraic signs, let it always be reckoned from the nearest syzygy, so that we may always have a equal to the sum of x and y . Also make $d^2 = \frac{S^2 \times \sin^2 2a}{M^2 + S^2 + 2M \times S \times \cos. 2a}$, which represents the $\frac{Sc^2}{SM^2}$ of fig. 4. or $\sin^2 2y$, and make $p = \frac{S \times \sin. 2a}{M + S \times \cos. 2a}$, which is the expression of $\frac{Sc}{Mc}$ of that figure, or of $\tan. 2y$. Then we shall have,

$$1. \sin. y = \sqrt{\frac{1 - \sqrt{1 - d^2}}{2}}. \text{ For we shall have } \cos. 2y = \sqrt{1 - d^2}. \text{ But } \sin^2 y = \frac{1}{2} - \frac{1}{2} \cos. 2y = \frac{1 - \sqrt{1 - d^2}}{2},$$

$$\text{and } \sin. y = \sqrt{\frac{1 - \sqrt{1 - d^2}}{2}}.$$

$$2. \tan. y = \frac{p}{1 + \sqrt{1 + p^2}}. \text{ For because } p \text{ is } = \tan. 2y, \sqrt{1 + p^2} \text{ is the secant of } 2y, \text{ and } 1 + \sqrt{1 + p^2} : 1 = p : \tan. y.$$

These processes for obtaining y directly are abundantly simple. But it will be much more expeditious and easy to content ourselves with obtaining $2y$ by means of the value of its tangent, viz. $\frac{S \cdot \sin. 2a}{M + S \cdot \cos. 2a}$. Or, we may find x by

means of the similar value of its tangent $\frac{Md}{Sd}$ of fig. 4.

There is still an easier method of finding both $2x$ and $2y$, as follows.

Make $M + S : M - S = \tan. a : \tan. b$. Then b is the difference of x and y , as a is their sum. For this analogy evidently gives the tangent of half the difference of the angles CSM and CMS of fig. 4. or of $2x$ and $2y$. Therefore to a , which is half the sum of $2x + 2y$, add b , and we have $2x = a + b$, or $x = \frac{a + b}{2}$, and $y = \frac{a - b}{2}$.

By either of these methods a table may be readily computed of the value of x or y for every value of a .

But we must recollect that the values of S and M are by no means constant, but vary in the inverse triplicate ratio of the earth's distance from the sun and moon; and the ratio of 2 to 5 obtains only when these luminaries are at their mean distances from the earth. The forces corresponding to the perigeon medium and apogean distances are as follow.

	Sun.	Moon.
Apogean	1,901	4,258
Medium	2,	5,
Perigeon	2,105	5,925

Hence we see that the ratio of S to M may vary from 1,901 : 5,925 to 2,105 : 4,258, that is, nearly from 1 : 3 to 1 : 2, or from 2 : 6 to 2 : 4. The solar force does not vary much, and may be retained as constant without any great error. But the change of the moon's force has great effects on the tides both as to their time and their quantity.

I. In respect of their Time.

1. The tide day following a spring tide is 24 h. 27' when the moon is in perigee, but 24 h. 33' when she is in apogee.
2. The tide day following neap tide is 25 h. 15', and 25 h. 40' in these two situations of the moon.
3. The greatest interval of time between high water and the moon's southing is 39' and 61'; the angle γ being $9^\circ 45'$ in the first case, and $15^\circ 15'$ in the second.

II. In respect of their Heights.

1. If the moon is in perigee when new or full, the spring tide will be 8 feet instead of 7, which corresponds to her mean distance. The very next spring tide happens when she is near her apogee, and will be 6 feet instead of 7. The neap tides happen when she is at her mean distance, and will therefore be 3 feet.

But if the moon be at her mean distance when new or full, the two succeeding spring tides will be regular or 7 feet, and one of the neap tides will be 4 feet and the other only 2 feet.

Mr Bernoulli has given us the following table of the time of high water for these three chief situations of the moon, namely, her perigee, mean distance, and apogee. It may be had by interpolation for all intermediate positions with as great accuracy as can be hoped for in phenomena which are subject to such a complication of disturbances. The first column contains the moon's elongation from the sun. The columns P, M, A, contain the minutes of time which elapse between the moon's southing and high water, according as she is in perigee, at her mean distance, or in apogee. The sign — indicates the priority, and + the posteriority, of high water to the moon's southing.

D and ☉	P.	M.	A.
0	—	—	—
10	9½	11½	14
20	18	22	27½
30	26	31½	39½
40	33	40	50
50	37½	45	56
60	38½	46½	58
70	33½	40½	50½
80	22	25	31
90	+	+	+
100	21	25	31
110	33½	40½	50½
120	38½	46½	58
130	37½	45	56
140	33	40	50
150	26	31½	39½
160	18	22	27½
170	9½	11½	14
180	0	0	0

The reader will undoubtedly be making some comparison in his own mind of the deductions from this theory with the actual state of things. He will find some considerable resemblances; but he will also find such great differences as will make him very doubtful of its justness. In very few places does the high water happen within ¼ths of an hour

of the moon's southing, as the theory leads him to expect; and in no place whatever does the spring tide fall on the day of new and full moon, nor the neap tide on the day of her quadrature. These always happen two or three days later. By comparing the difference of high water and the moon's southing in different places, he will hardly find any connecting principle. This shows evidently that the cause of this irregularity is local, and that the justness of the theory is not affected by it. By considering the phenomena in a navigable river, he will learn the real cause of the deviation. A flood tide arrives at the mouth of a river. The true theoretical tide differs in no respect from a wave. Suppose a spring tide actually formed on a fluid sphere, and the sun and moon then annihilated. The elevation must sink, pressing the under-waters aside, and causing them to rise where they were depressed. The motion will not stop when the surface comes to a level; for the waters arrived at that position with a motion continually accelerated. They will therefore pass this position as a pendulum passes the perpendicular, and will rise as far on the other side, forming a high water where it was low water, and a low water where it was high water; and this would go on for ever, oscillating in a time which mathematicians can determine, if it were not for the viscosity, or something like friction, of the waters. If the sphere is not fluid to the centre, the motion of this wave will be different. The elevated waters cannot sink without diffusing themselves sidewise, and occasioning a great horizontal motion, in order to fill up the hollow at the place of low water. This motion will be greatest about half way between the places of high and low water. The shallower we suppose the ocean the greater must this horizontal motion be. The resistance of the bottom (tho' perfectly smooth and even) will greatly retard it all the way to the surface. Still, however, it will move till all be level, and will even move a little farther, and produce a small flood and ebb where the ebb and flood had been. Then a contrary motion will obtain; and after a few oscillations, which can be calculated, it will be insensible. If the bottom of the ocean (which we still suppose to cover the whole earth) be uneven, with long extended valleys running in various directions, and with elevations reaching near the surface, it is evident that this must occasion great irregularities in the motion of the undermost waters, both in respect of velocity and direction, and even occasion small inequalities on the surface, as we see in a river with a rugged bottom and rapid current. The deviations of the under currents will drag with them the contiguous incumbent waters, and thus occasion greater superficial irregularities.

Now a flood arriving at the mouth of a river, must act precisely as this great wave does. It must be propagated up the river (or along it, even though perfectly level) in a certain time, and we shall have high water at all the different places in succession. This is distinctly seen in all rivers. It is high water at the mouth of the Thames at three o'clock, and later as we go up the river, till at London bridge we have not high water till three o'clock in the morning, at which time it is again high water at the Nore. But, in the mean time, there has been low water at the Nore, and high water about half way to London; and while the high water is proceeding to London, it is ebbing at this intermediate place, and is low water there when it is high water at London and at the Nore. Did the tide extend as far beyond London as London is from the Nore, we should have three high waters with two low waters interposed. The most remarkable instance of this kind is the Maragnon or Amazon river in South America. It appears by the observations of Condamine and others, that between Para, at the mouth of the river, and the conflux of the Ma-

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dera and Maragnon, there are seven coexistent high waters, with six low waters between them. Nothing can more evidently show that the tides in these places are nothing but the propagation of a wave. The velocity of its superficial motion, and the distance to which it will sensibly go, must depend on many circumstances. A deep channel and gentle acclivity will allow it to proceed much farther up the river, and the distance between the successive summits will be greater than when the channel is shallow and steep. If we apply the ingenious theory of Chevalier Buat, delivered in the article RIVER, we may tell both the velocity of the motion and the interval of the successive high waters. It may be imitated in artificial canals, and experiments of this kind would be very instructive. We have said enough at present for our purpose of explaining the irregularity of the times of high water in different places, with respect to the moon's southing. For we now see clearly, that something of the same kind must happen in all great arms of the sea which are of an oblong shape, and communicate by one end with the open ocean. The general tide in this ocean must proceed along this channel, and the high water will happen on its shores in succession. This also is distinctly seen. The tide in the Atlantic ocean produces high water at new and full moon at a later and later hour along the south coast of Great Britain in proportion as we proceed from Scilly islands to Dover. In the same manner it is later and later as we come along the east coast from Orkney to Dover. Yet even in this progress there are considerable irregularities, owing to the sinuosities of the shores, deep indented bays, prominent capes, and extensive ridges and valleys in the channel. A similar progress is observed along the coasts of Spain and France, the tide advancing gradually from the south, turning round Cape Finisterre, ranging along the north coast of Spain, and along the west and north coasts of France.

The attentive consideration of these facts will not only satisfy us with respect to this difficulty, but will enable us to trace a principle of connection amidst all the irregularities that we observe.

We now add, that if we note the difference between the time of high water of spring tide, as given by theory, for any place, and the *observed time* of high water, we shall find this interval to be very nearly constant thro' the whole series of tides during a lunation. Suppose this interval to be forty hours. We shall find every other phenomenon succeed after the same interval. And if we suppose the moon to be in the place where she was 40 hours before, the observation will agree pretty well with the theory, as to the succession of tides, the length of tide day, the retardations of the tides, and their gradual diminution from spring to neap tide. We say pretty well; for there still remain several small irregularities, different in different places, and not following any observable law. These are therefore local, and owing to local causes. Some of these we shall afterwards point out. There is also a general deviation of the theory from the real series of tides. The neap tides, and those adjoining, happen a little earlier than the corrected theory points out. Thus at Brest (where more numerous and accurate observations have been made than at any other place in Europe), when the moon changes precisely at noon, it is high water at 3h. 28'. When the moon enters her second quarter at noon, it is high water at 8h. 40', instead of 9h. 48', which theory assigns.

Something similar, and within a very few minutes equal, to this is observed in *every* place on the sea-coast. This is therefore something general, and indicates a real defect in the theory.

But this arises from the same cause with the other general deviation, viz. that the greatest and least tides do not happen

on the days of full and half moon, but a certain time after. We shall attempt to explain this.

We set out with the supposition, that the water acquired in an instant the elevation competent to its equilibrium. But this is not true. No motion is instantaneous, however great the force; and every motion and change of motion produced by a sensible or finite force increases from nothing to a sensible quantity by infinitely small degrees. Time elapses before the body can acquire any sensible velocity; and in order to acquire the same sensible velocity by the action of different forces acting similarly, a time must elapse inversely proportional to the force. An infinitely small force requires a finite time for communicating even an infinitely small velocity; and a finite force, in an infinitely small time, communicates only an infinitely small velocity; and if there be any kind of motion which changes by insensible degrees, it requires a finite force to prevent this change. Thus a bucket of water, hanging by a cord lapped round a light and easily moveable cylinder, will run down with a motion uniformly accelerated; but this motion will be prevented by hanging an equal bucket on the other side, so as to act with a finite force. This force prevents only infinitely small accelerations.

Now let ALKF (fig. 6.) be the solid nucleus of the earth, surrounded by the spherical ocean *bbdg*. Let this be raised to a spheroid BHDG by the action of the moon at M, or in the direction of the axis CM. If all be at rest, this spheroid may have the form precisely competent to its equilibrium. But let the nucleus, with its spheroidal ocean, have a motion round C in the direction AFKL from west to east. When the line of water BA is carried into the situation *sg* infinitely near to BA, it is no longer in equilibrium; for *s* is too elevated, and the part now come to B is too much depressed. There is a force tending to depress the waters at *s*, and to raise those now at B; but this force is infinitely small. It cannot therefore restore the shape competent to equilibrium till a sensible time has elapsed; therefore the disturbing force of the moon cannot keep the summit of the ocean in the line MC. The force must be of a certain determinate magnitude before it can in an instant undo the instantaneous effect of the rotation of the waters and keep the summit of the ocean in the same place. But this effect is possible; for the depression at *s* necessary for this purpose is nearly as the distance from B, being a depression, not from a straight line, but from a circle described with the radius CB. It is therefore an infinitesimal of the first order, and may be restored in an instant, or the continuation of the depression prevented by a certain finite force. Therefore there is some distance, such as B*y*, where the disturbing force of the moon may have the necessary intensity. Therefore the spherical ocean, instead of being kept continually accumulated at B and D, as the waters turn round, will be kept accumulated at *y* and *y'*, but at a height somewhat smaller. It is much in this way that we keep melted pitch or other clammy matter from running off from a brush, by continually turning it round, and it hangs protuberant, not from the lowest point, but from a point beyond it, in the direction of its motion. The facts are very similar. The following experiment will illustrate this completely, and is quite a parallel fact. Conceive GDH, the lower half of the ellipse, to be a supple heavy rope or chain hanging from a roller with a handle. The weight of the rope makes it hang in an oblong curve, just as the force of the moon raises the waters of the ocean. Turn the roller very slowly, and the rope, unwinding at one side and winding up on the other side of the roller, will continue to form the same curve: but turn the roller very briskly in the direction FKL, and the rope will now hang like the curve *ny'v*, considerably advanced

Tide.

Tide. advanced from the perpendicular, so far, to wit, that the force of gravity may be able in an instant to undo the infinitely small elevation produced by the turning.

We are very anxious to have this circumstance clearly conceived, and its truth firmly established; because we have observed it to puzzle many persons not unaccustomed to such discussions: we therefore hope that our readers, who have got over the difficulty, will indulge us while we give yet another view of this matter, which leads to the same conclusion.

It is certain that the interval between high and low water is not sufficient for producing all the accumulation necessary for equilibrium in an ocean so very shallow. The horizontal motion necessary for gathering together so much water along a shallow sea would be prodigious. Therefore it never attains its full height; and when the waters, already raised to a certain degree, have passed the situation immediately under the moon, they are still under the action of accumulating forces, although these forces are now diminished. They will continue rising, till they have so far past the moon that their situation subjects them to depressing forces. If they have acquired this situation with an accelerated motion, they will rise still farther by their inherent motion, till the depressing forces have destroyed all their acceleration, and then they will begin to sink again. It is in this way that the nutation of the earth's axis produces the greatest inclination, not when the inclining forces are greatest, but three months after. It is thus that the warmest time of the day is a considerable while after noon, and that the warmest season is considerably after midsummer. The warmth increases till the momentary waste of heat exceeds the momentary supply. We conclude, by saying, that it may be demonstrated, that, in a sphere fluid to the centre, the time of high water cannot be less, and may be more, than three lunar hours after the moon's southing. As the depth of the ocean diminishes, this interval also diminishes.

It is perhaps impossible to assign the distance $B y$ at which the summit of the ocean may be kept while the earth turns round its axis. We can only see, that it must be less when the accumulating force is greater, and therefore less in spring tides than in neap tides; but the difference may be insensible. All this depends on circumstances which we are little acquainted with: many of these circumstances are local; and the situation of the summit of the ocean, with respect to the moon, may be different in different places.

Nor have we been able to determine theoretically what will be the height of the summit. It will certainly be less than the height necessary for perfect equilibrium. Daniel Bernoulli says, that, after very attentive consideration, he is convinced that the height at new or full moon will be to the theoretical height as the cosine of the angle $BC y$ to radius, or that the height at y will be $B b \times \frac{C a}{C b}$.

The result of all this reasoning is, that we must always suppose the summit of the tide is at a certain distance eastward from the place assigned by the theory. Mr Bernoulli concludes, from a very copious comparison of observations at different places, that the place of high water is about 20 degrees to the eastward of the place assigned by the theory. Therefore the table formerly given will correspond with observation, if the leading column of the moon's elongation from the sun be altered accordingly. We have inserted it again in this place, with this alteration, and added three columns for the times of high water. Thus changed it will be of great use.

We have now an explanation of the acceleration of the neap tides, which should happen 6 hours later than the

spring tides. They are in fact tides corresponding to positions of the moon, which are 20° more, and not the real spring and neap tides. These do not happen till two days after; and if the really greatest and least tides be observed, the least will be found 6 hours later than the first.

Tide.

Elong. of Moon.	High Water before or after Moon's Southing.			Time of High Water.		
	Perigee.	M. Dist.	Apogee.	Perigee.	M. Dist.	Apogee.
0	18 after	22 after	27 $\frac{1}{2}$ after	0.18	0.22	0.27 $\frac{1}{2}$
10	9 $\frac{1}{2}$ do.	11 $\frac{1}{2}$	14	0.49 $\frac{1}{2}$	0.51 $\frac{1}{2}$	0.54
20	0 do.	0	0	1.20	1.20	1.20
30	9 $\frac{1}{2}$ bef.	11 $\frac{1}{2}$ bef.	14 bef.	1.50 $\frac{1}{2}$	1.48	1.46
40	18 do.	22	27 $\frac{1}{2}$	2.22	2.18	2.12
50	26	31 $\frac{1}{2}$	39 $\frac{1}{2}$	2.54	2.48	2.40
60	33	40	50	3.27	3.20	3.10
70	37 $\frac{1}{2}$	45	56	4.02 $\frac{1}{2}$	3.55	3.44
80	38 $\frac{1}{2}$	46 $\frac{1}{2}$	58	4.41 $\frac{1}{2}$	4.33	4.22
90	33 $\frac{1}{2}$	40 $\frac{1}{2}$	50 $\frac{1}{2}$	5.26 $\frac{1}{2}$	5.19	5.09
100	22	25	31	6.19	6.15	6.09
110	0	0	0	7.20	7.20	7.20
120	22 after	25 after	31 after	8.21	8.25	8.31
130	33 $\frac{1}{2}$ after	40 $\frac{1}{2}$	50 $\frac{1}{2}$	9.13 $\frac{1}{2}$	9.20	9.30
140	38 $\frac{1}{2}$	46 $\frac{1}{2}$	58	9.58 $\frac{1}{2}$	10.06	10.18
150	37 $\frac{1}{2}$	45	56	10.37 $\frac{1}{2}$	10.45	10.56
160	33	40	50	11.13	11.20	11.30
170	26	31 $\frac{1}{2}$	29 $\frac{1}{2}$	11.46	11.51	11.59
180	18	22	27 $\frac{1}{2}$	0.18	0.22	0.27

This table is general; and exhibits the time of high water, and their difference from those of the moon's southing, in the open sea, free from all local obstructions. If therefore the time of high water in any place on the earth's equator (for we have hitherto considered no other) be different from this table (supposed correct), we must attribute the difference to the distinguishing circumstances of the situation. Thus every place on the equator should have high water on the day that the moon, situated at her mean distance, changes precisely at noon, at 22 minutes past noon; because the moon passes the meridian along with the sun by supposition. Therefore, to make use of this table, we must take the difference between the first number of the column, intitled time of high water, from the time of high water at full and change peculiar to any place, and add this to all the other numbers of that column. This adapts the table to the given place. Thus, to know the time of high water at Leith when the moon is 50° east of the sun, at her mean distance from the earth, take 22' from 4h. 30', there remains 4.08. Add this to 2h. 48', and we have 6h. 56' for the hour of high water. (The hour of high water at new and full moon for Edinburgh is marked 4h. 30' in Maskelyne's tables, but we do not pretend to give it as the exact determination. This would require a series of accurate observations.)

It is by no means an easy matter to ascertain the time of high water with precision. It changes so very slowly, that we may easily mistake the exact minute. The best method is to have a pipe with a small hole near its bottom, and a float with a long graduated rod. The water gets in by the small hole and raises the float, and the smallness of the hole prevents the sudden and irregular starts which waves would occasion. Instead of observing the moment of high water, observe the height of the rod about half an hour before, and wait after high water till the rod comes again to that height: take the middle between them. The water rises sensibly.

Tide. sensibly half an hour before the top of the tide, and quickly changes the height of the rod, so that we cannot make a great mistake in the time.

Mr Bernoulli has made a very careful comparison of the theory thus corrected, with the great collection of observations preserved in the *Depot de la Marine* at Brest and Rochefort*; and finds the coincidence very great, and far exceeding any rule which he had ever seen. Indeed we have no rules but what are purely empirical, or which suppose a uniform progression of the tides.

* See Mr
Cassini,
Mem. Acad.
Paris,
1734.

The heights of the tides are much more affected by local circumstances than the regular series of their times. The regular spring tide should be to the neap tide in the same proportion in all places; but nothing is more different than this proportion. In some places the spring tide is not double of the neap tide, and in other places it is more than quadruple. This prevented Bernoulli from attempting to fix the proportion of M to S by means of the heights of the tides. Newton had, however, done it by the tides at Bristol, and made the lunar force almost five times greater than the solar force. But this was very ill-founded, for the reason now given.

Yet Bernoulli saw, that in all places the tides gradually decreased from the syzigies to the quadratures. He therefore presumed, that they decreased by a similar law with the theoretical tides, and has given a very ingenious method of accommodating the theory to any tides which may be observed. Let A be the spring tide, and B the neap tide in any place. Then form an M and an S from these, by making $M = \frac{A+B}{2}$, and $S = \frac{A-B}{2}$; so that $M + S$ may be = A, and $M - S = B$ agreeable to theory. Then with this M and S compose the general tide T, agreeable to the construction of the problem. We may be persuaded that the result cannot be far from the truth. The following table is calculated for the three chief distances of the moon from the earth.

Elong. D & C	Height of the Tide.		
	Moon in Perigee.	Moon in M. Dist.	Moon in Apogee.
0	0,99A + 0,15B	0,88A + 0,12B	0,79A + 0,08B
10	1,10A + 0,04B	0,97A + 0,03B	0,87A + 0,02B
20	1,14A + 0,00B	1,00A + 0,00B	0,90A + 0,00B
30	1,10A + 0,04B	0,97A + 0,03B	0,87A + 0,02B
40	0,99A + 0,15B	0,88A + 0,12B	0,79A + 0,08B
50	0,85A + 0,32B	0,75A + 0,25B	0,68A + 0,18B
60	0,67A + 0,53B	0,59A + 0,41B	0,53A + 0,29B
70	0,46A + 0,75B	0,41A + 0,59B	0,37A + 0,41B
80	0,28A + 0,96B	0,25A + 0,75B	0,23A + 0,53B
90	0,13A + 1,13B	0,12A + 0,88B	0,11A + 0,62B
100	0,03A + 1,24B	0,03A + 0,97B	0,03A + 0,68B
110	0,00A + 1,28B	0,00A + 1,00B	0,00A + 0,70B
120	0,03A + 1,24B	0,03A + 0,97B	0,03A + 0,68B
130	0,13A + 1,13B	0,12A + 0,88B	0,11A + 0,62B
140	0,28A + 0,96B	0,25A + 0,75B	0,23A + 0,53B
150	0,46A + 0,75B	0,41A + 0,59B	0,37A + 0,41B
160	0,67A + 0,53B	0,59A + 0,41B	0,53A + 0,29B
170	0,85A + 0,32B	0,75A + 0,25B	0,68A + 0,18B
180	0,99A + 0,15B	0,88A + 0,12B	0,79A + 0,08B

Observe that this table is corrected for the retardation arising from the inertia of the waters. Thus when the moon is 20 degrees from the sun, the mean distance tide is 1,00A + 0,00B, which is the theoretical tide corresponding to conjunction or opposition.

Tide. We have now given in sufficient detail the phenomena of the tides along the equator, when the sun and moon are both in the equator, shewing both their times and their magnitude. When we recollect that all the sections of an oblong spheroid by a plane passing through an equatorial diameter are ellipses, and that the compound tide is a combination of two such spheroids, we perceive that every section of it through the centre, and perpendicular to the plane in which the sun and moon are situated, is also an ellipse, whose shorter axis is the equatorial diameter of a spring tide. This is the greatest depression in all situations of the luminaries; and the points of greatest depression are the lower poles of every compound tide. When the luminaries are in the equator, these lower poles coincide with the poles of the earth. The equator, therefore, of every compound tide is also an ellipse; the whole circumference of which is lower than any other section of this tide, and gives the place of low water in every part of the earth. In like manner, the section through the four poles, upper and lower, gives the place of high water. These two sections are terrestrial meridians or hour circles, when the luminaries are in the equator.

Hence it follows, that all that we have already said as to the times of high and low water may be applied to every place on the surface of the earth, when the sun and moon are in the equator. But the heights of tide will diminish as we recede from the equator. The heights must be reduced in the proportion of radius to the cosine of the latitude of the place. But in every other situation of the sun and moon all the circumstances vary exceedingly. It is very true, that the determination of the elevation of the waters in any place whatever is equally easy. The difficulty is, to exhibit for that place a connected view of the whole tide, with the hours of flood and ebb, and the difference between high and low water. This is not indeed difficult; but the process by the ordinary rules of spherical trigonometry is tedious. When the sun and moon are not near conjunction or opposition, the shape of the ocean resembles a turnip, which is flat and not round in its broadest part. Before we can determine with precision the different phenomena in connection, we must ascertain the position or attitude of this turnip; marking on the surface of the earth both its elliptical equators. One of these is the plane passing thro' the sun and moon, and the other is perpendicular to it, and marks the place of low water. And we must mark in like manner its first meridian, which passes through all the four poles, and marks on the surface of the earth the place of high water. The position of the greatest section of this compound spheroid is frequently much inclined to the earth's equator; nay, sometimes is at right angles to it, when the moon has the same right ascension with the sun, but a different declination. In these cases the ebb tide on the equator is the greatest possible; for the lower poles of the compound spheroid are in the equator. Such situations occasion a very complicated calculus. We must therefore content ourselves with a good approximation.

And first, with respect to the times of high water. It will be sufficient to conceive the sun and moon as always in one plane, viz. the ecliptic. The orbits of the sun and moon are never more inclined than $5\frac{1}{2}$ degrees. This will make very little difference; for when the luminaries are so situated that the great circle through them is much inclined to the equator, they are then very near to each other, and the form of the spheroid is little different from what it would be if they were really in conjunction or opposition. It will therefore be sufficient to consider the moon in three different situations.

1. In the equator. The point of highest water is never farther

Tide. ther from the moon than 15° , when she is in apogee and the sun in perigee. Therefore if a meridian be drawn thro' the point of highest water to the equator, the arch mb of fig. 4. will be represented on the equator by another arch about $\frac{1}{2}^\circ$ of this by reason of the inclination of the equator and ecliptic. Therefore, to have the time of high water, multiply the numbers of the columns which express the difference of high water and the moon's southing by $\frac{1}{2}^\circ$, and the products give the real difference.

2. Let the moon be in her greatest declination. The arch of right ascension corresponding to mb will be had by multiplying mb , or the time corresponding to it in the table, by $\frac{1}{2}^\circ$.

3. When the moon is in a middle situation between these two extremes, the numbers of the table will give the right ascension corresponding to mb without any correction, the distance from the equator compensating for the obliquity of the ecliptic arch mb .

The time of low water is not so easily found; and we must either go through the whole trigonometrical process, or content ourselves with a less perfect approximation. The trigonometrical process is not indeed difficult: We must find the position of the plane through the sun and moon. A great circle through the moon perpendicular to this is the line of high water; and another perpendicular circle cutting this at right angles is the circle of low water.

But it will be abundantly exact to consider the tide as accompanying the moon only.

Let $NQSE$ (fig. 7.) be a section of the terraqueous globe, of which N and S are the north and south poles and EQ the equator. Let the moon be in the direction OM , having the declination BQ . Let D be any place on the earth's surface. Draw the parallel LDC of latitude. Let $B'F'f'$ be the ocean, formed into a spheroid, of which Bb is the axis and fF the equator.

As the place D is carried along the parallel CDL by the rotation of the earth, it will pass in succession through different depths of the watery spheroid. It will have high water when at C and L , and low water when it crosses the circle fOF . Draw the meridian NdG , and the great circle Bdb . The arch GQ , when converted into lunar hours (each about 62 minutes), gives the duration of the flood and of the subsequent ebb ed , which happen while the moon is above the horizon; and the arch EG will give the durations of the flood and of the ebb which happen when the moon is below the horizon. It is evident, that these two floods and two ebbs have unequal durations. When D is at C it has high water; and the height of the tide is CC' . For the spheroid is supposed to touch the sphere on the equator fOF , so that of CC' is the difference between high and low water. At L the height of the tide is LL' ; and if we describe the circle LNq , $C'q$ is the difference of these high waters, or of these tides.

Hence it appears, that the two tides of one lunar day may be considerably different, and it is proper to distinguish them by different names. We shall call that a *superior tide* which happens when the moon is above the horizon during high water. The other may be called the *inferior tide*. The duration of the superior tide is measured by $2GQ$, and that of the inferior tide by $2EG$, and $4GO$ measures the difference between the whole duration of a superior and of an inferior tide.

From this construction we may learn in general, 1. When the moon has no declination, the durations and also the heights of the superior and inferior tides are equal in all parts of the world. For in this case the tide equator fF coincides with the meridian NOS , and the poles $B'f'$ of the watery spheroid are on the earth's equator.

Tide. 2. When the moon has declination, the duration and also the height of a superior tide at any place is greater than that of the inferior; or is less than it, according as the moon's declination and the latitude of the place are of the same or opposite names.

This is an important circumstance. It frequently happens that the inferior tide is found the greatest when it should be the least; which is particularly the case at the Nore. This shows, without further reasoning, that the tide at the Nore is only a branch of the regular tide. The regular tide comes in between Scotland and the continent; and after travelling along the coast reaches the Thames, while the regular tide is just coming in again between Scotland and the continent.

3. If the moon's declination is equal to the colatitude of the place, or exceeds it, there will be only one tide in a lunar day. It will be a superior or an inferior tide, according as the declination of the moon and the latitude of the place are of the same or opposite kinds. For the equator of the tide cuts the meridian in f and F . Therefore a place which moves in the parallel cf has high water when at c , and 12 lunar hours afterwards, has low water when at f . And any place k which is still nearer to the pole N has high water when at k , and 12 lunar hours afterwards has low water at m . Therefore, as the moon's declination extends to 30° , all places farther north or south than the latitude 60° will sometimes have only one tide in a lunar day.

4. The sine of the arch GO , which measures $\frac{1}{2}$ th of the difference between the duration of a superior and inferior tide, is $= \tan. lat. \times \tan. decl.$ For in the spherical triangle dOG

Rad : cotan. $dOG = \tan. dG : \sin. GO$, and

$\sin. GO = \tan. dOQ \times \tan. dG = \tan. decl. \times \tan. lat.$

Hence we see, that the difference of the durations of the superior and inferior tides of the same day increase both with the moon's declination and with the latitude of the place.

The different situations of the moon and of the place of observation affect the heights of the tides no less remarkably. When the point D comes under the meridian NBQ in which the moon is situated, there is a superior high water, and the height of the tide above the low water of that day is CC' . When D is at L , the height of the inferior tide is LL' . The elevation above the inscribed sphere is $M \times \cos. z$, z being the zenith distance of the moon at the place of observation. Therefore at high water, which by the theory is in the place directly under the moon, the height of the tide is as the square of the cosine of the moon's zenith or nadir distance.

Hence we derive a construction which solves all questions relating to the height of the tides with great facility, free from all the intricacy and ambiguities of the algebraic analysis employed by Bernoulli.

With the radius $CQ = M$ (the elevation produced by the moon above the inscribed sphere) describe the circle $pQPE$ (fig. 8.) to represent a meridian, of which P and p are the poles, and EQ the equator. Bisect CP in O ; and round O describe the circle $PBCD$. Let M be the place over which the moon is vertical, and Z be the place of observation. MQ is the moon's declination, and ZQ is the latitude of the place. Draw MCm , ZCN , cutting the small circle in A and B . Draw AGI perpendicular to CP , and draw CLu , which will cut off an arch $Ea = QM$. MZ and uN are the moon's zenith and nadir distances. Draw the diameter BD , and the perpendiculars IK , GH , and AF . Also draw OA , PA , AB , ID .

Then DF is the superior tide, DK is the inferior tide, and DH is the arithmetical mean tide.

For

Tide.

For the angles $\angle BCA$, $\angle BDA$, standing on BA , are equal. Also the angles $\angle DB$, $\angle CN$, are equal, being supplements of the angle $\angle ICB$. Therefore, if BD be made radius, DA and DI are the sines of the zenith and nadir distances of the moon.

But $BD : DA = DA : DF$. Therefore $DF = M \times \cos^2 y$, = the height Zz of the superior tide. Also $DK = M \cdot \cos^2 y'$, = the height nn' of the inferior tide.

Also, because IA is bisected in G , KF is bisected in H , and $DH = \frac{DK + DF}{2}$, = the medium tide.

Let us trace the relation of the consequences of the various positions of Z and M , as we formerly considered the results of the various situations of the sun and moon.

First, then, let Z retain its place, and let M gradually approach it from the equator. When M is in the equator, A and I coincide with C , and the three points F , K , and H , coincide in i .

As M approaches to Z , A and I approach to B and D ; DF increases, and DK diminishes. The superior or inferior tide is greatest when the moon is in M or in N ; and DF is then $= M$. As the moon passes to the northward of the place, the superior and inferior tides both diminish till I comes to D ; at which time MQ is equal to ZP , and there is no inferior tide. This however cannot happen if zP is greater than 30° , because the moon never goes farther from the equator. M still going north, we have again a perpendicular from I on BD , but below I , indicating that the inferior tide, now measured by DK , belongs to the hemispheroid next the moon. Also, as M advances from the equator northward, DH diminishes continually. First, while H lies between O and B , because G approaches O ; and afterwards, when G is above O and H lies between O and D . It is otherwise, however, if ZQ is greater than 45° ; for then DB is inclined to EQ the other way, and DH increases as the point G rises.

In the next place, let M retain its position, and Z proceed along the meridian.

Let us begin at the equator, or suppose Q the place of observation. BD then coincides with CP , and the three lines DF , DK , and DH , all coincide with PG , denoting the two equal tides Qq and Ee and their medium, equal to either. As Z goes northward from Q , BOD detaches itself from COP ; the line DF increases, while DK and DH diminish. When Z has come to M , F and B coincide with A , and DK and DH are still more diminished. When Z passes M , all the three lines DF , DK , and DH , continue to diminish. When Z comes to latitude 45° , DB is parallel to IA and EQ , and the point H coincides with O . This situation of Z has the peculiar property that DH (now DO) is the same, whatever be the declination of the moon. For IA being always parallel to DB , OK and OF will be equal, and DO will be half of DK and DF however they may vary. When Z gets so far north that ZP is $= MQ$, the diameter bd falls on I ; so that dk vanishes, and we have only df . And when Z goes still farther north, dk appears on the other side of I . When Z arrives at the pole, BD again coincides with PC , D with C , and DF , DK , and DH , coincide with CG .

These variations of the points F , K , and H , indicate the following phenomena.

1. The greatest tides happen when the moon is in the zenith or nadir of the place of observation: for then the point B coincides with A , and DF becomes DB ; that is, $= M$, indicating the full tide BB' .

2. When the moon is in the equator, the superior and inferior tides have equal heights, $= M \cdot \cos^2 \text{lat.}$ For then

Tide.

A and I coincide with C , and the points F and K coincide in i , and Di is $= DB \cdot \cos^2 \angle BDC$, $= M \cdot \cos^2 \text{lat.}$

3. If the place of observation is in the equator, the inferior and superior tides are again equal, whatever is the moon's declination: For then B coincides with C , and the points F , K , and H , coincide with G ; and $PG = PC \cdot \cos^2 \angle APG$, $= M \cdot \cos^2 \text{decl. moon.}$

4. The superior tides are greater or less than the inferior tides according as the latitude and declination are of the same or of opposite names. For by making $Qz = QZ$, and drawing zCn , cutting the small circle in β , we see that the figure is reversed. The difference between the superior and inferior tides is KF , or $IA \times \cos \text{fin.}$ of the angle formed by IA and DB ; that is, of the angle $\angle BD\delta$, which is the complement of twice ZQ ; because $\angle BOC = 2 \angle ZCQ$. Now IA is $2 GA$, $= 2 OA \cdot \sin. 2 MQ = PC \cdot \sin. 2 MQ$, $= M \cdot \sin. 2 \text{ decl.}$ Therefore the difference of the superior and inferior tides is $M \cdot \sin. 2 \text{ declin. fin. } 2 \text{ lat.}$

5. If the colatitude be equal to the declination, or less than it, there will be no inferior tide, or no superior tide, according as the latitude of the place and declination of the moon are of the same or opposite names.

For when $PZ = MQ$, D coincides with I , and IK vanishes. When PZ is less than MQ , the point D is between C and I , and the point Z never passes through the equator of the watery spheroid; and the low water of its only tide is really the summit of the inferior tide.

6. At the pole there is no daily tide: but there are two monthly tides $= M \cdot \sin^2 \text{ declin.}$ and it is low water when the moon is in the equator.

7. The medium tide, represented by DH , is $= M \times \frac{1 + \cos. 2 \text{ lat.} \times \cos. 2 \text{ declin.}}{2}$. For $DH = DO + OH$.

Now OH is equal to $OG \times \cos. \angle GOH = OG \cdot \cos. 2 ZQ$. And $OG = OA \cdot \cos. \angle GOA$, $= OA \cdot \cos. 2 MQ$. Therefore $OH = OA \cdot \cos. 2 ZQ \cdot \cos. 2 MQ$. Therefore $DH = OA + OA \cdot \cos. 2 ZQ \cdot \cos. 2 MQ = M \times \frac{1 + \cos. 2 ZQ \cdot \cos. 2 MQ}{2}$. Let this for the future be called m .

N. B. The moon's declination never exceeds 30° . Therefore $\cos. 2 MQ$ is always a positive quantity, and never less than $\frac{1}{2}$, which is the cosine of 60° . While the latitude is less than 45° , $\cos. 2 \text{ lat.}$ is also a positive quantity. When it is precisely 45° the cosine of its double is 0; and when it is greater than 45° , the cosine of its double is negative. Hence we see,

1. That the medium tides are equally affected by the northern and southern declinations of the moon.

2. If the latitude of the place is 45° , the medium tide is always $\frac{1}{2} M$. This is the reason why the tides along the coasts of France and Spain are so little affected by the declination of the moon.

3. If the latitude is less than 45° , the mean tides increase as the moon's declination diminishes. The contrary happens if ZQ is greater than 45° . For DH increases or diminishes while the point G separates from C according as the angle $\angle COD$ is greater or less than $\angle COB$; that is, according as $\angle PCZ$ is greater or less than $\angle ZCQ$.

4. When Z is in the equator, H coincides with G , and the effect of the moon's declination on the height of the tides is the most sensible. The mean tide is then $= M \frac{1 + \cos. 2 MQ}{2}$.

All that we have now said may be said of the solar tide, putting S in place of M .

Also the same things hold true of spring tides, putting $M + S$ in place of M .

But,

Fig. 1.

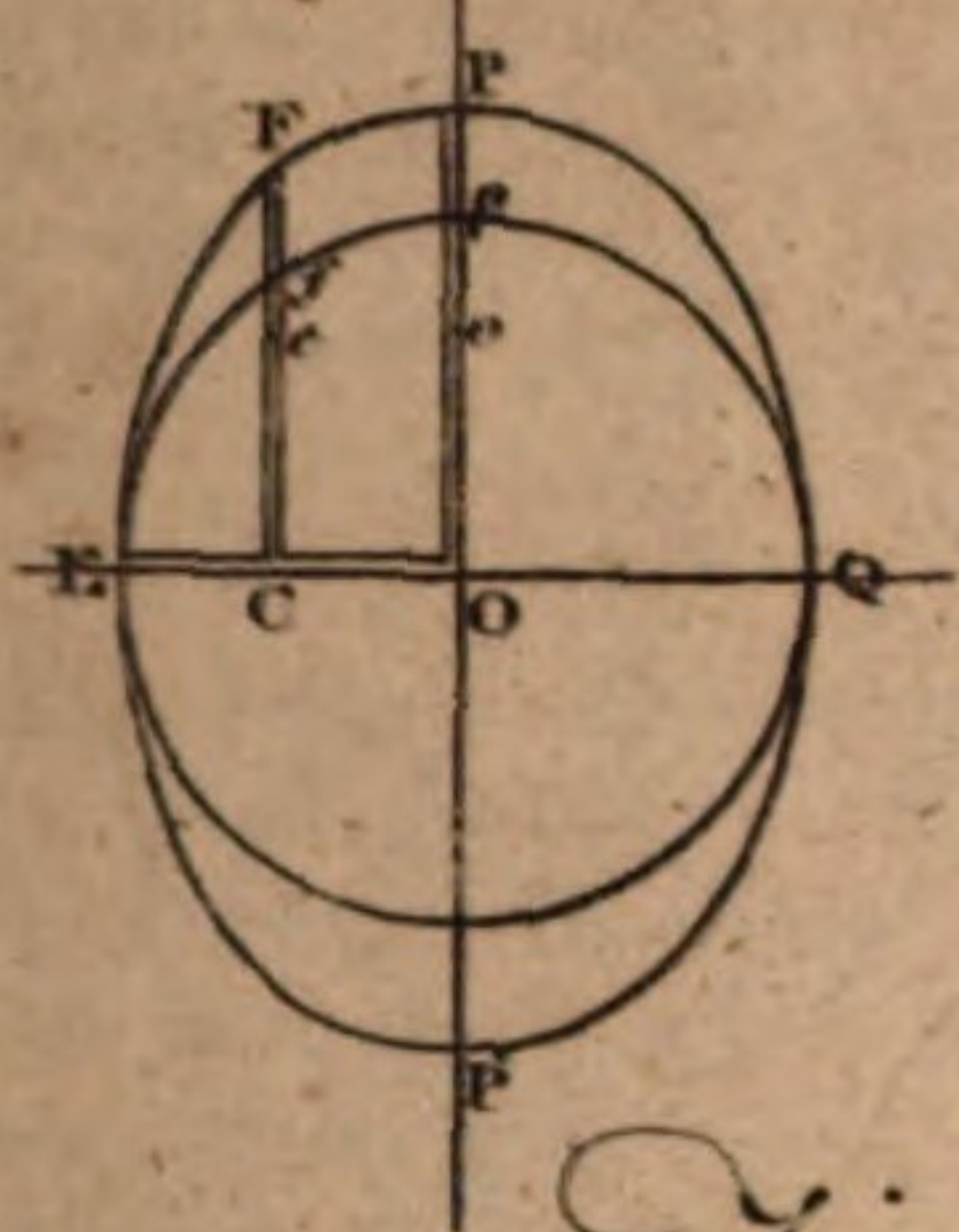


Fig. 2.

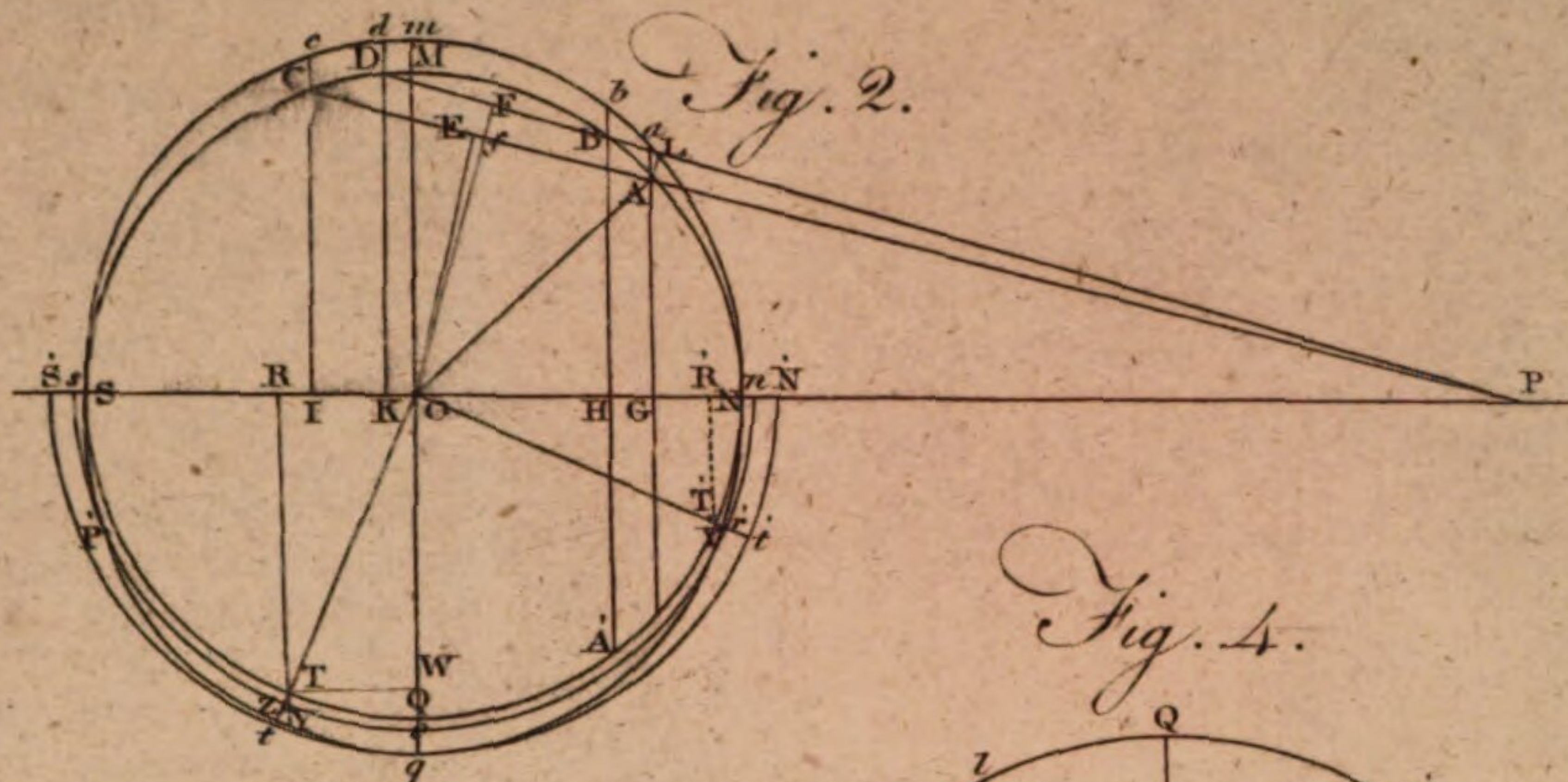


Fig. 3.

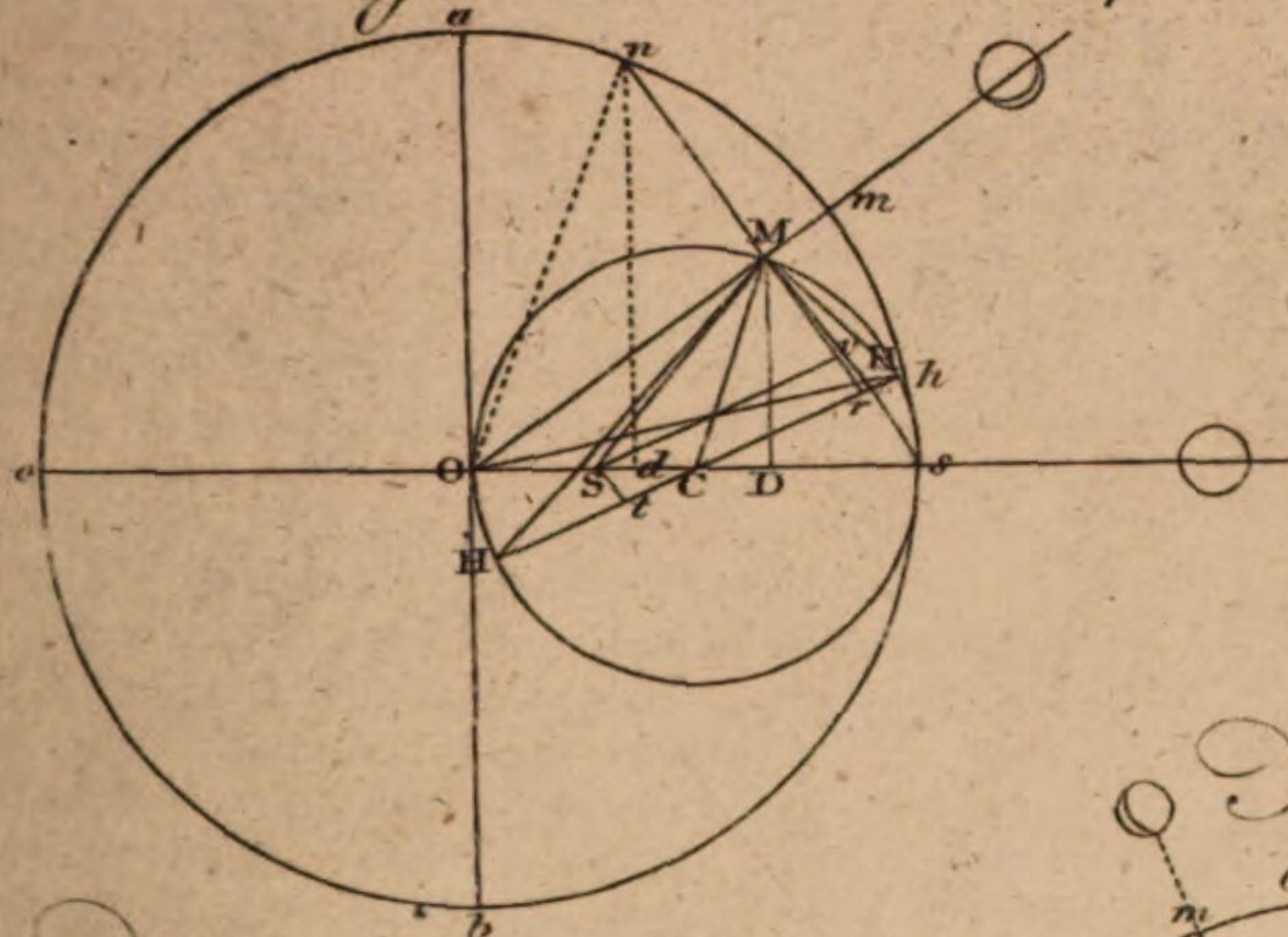


Fig. 4.

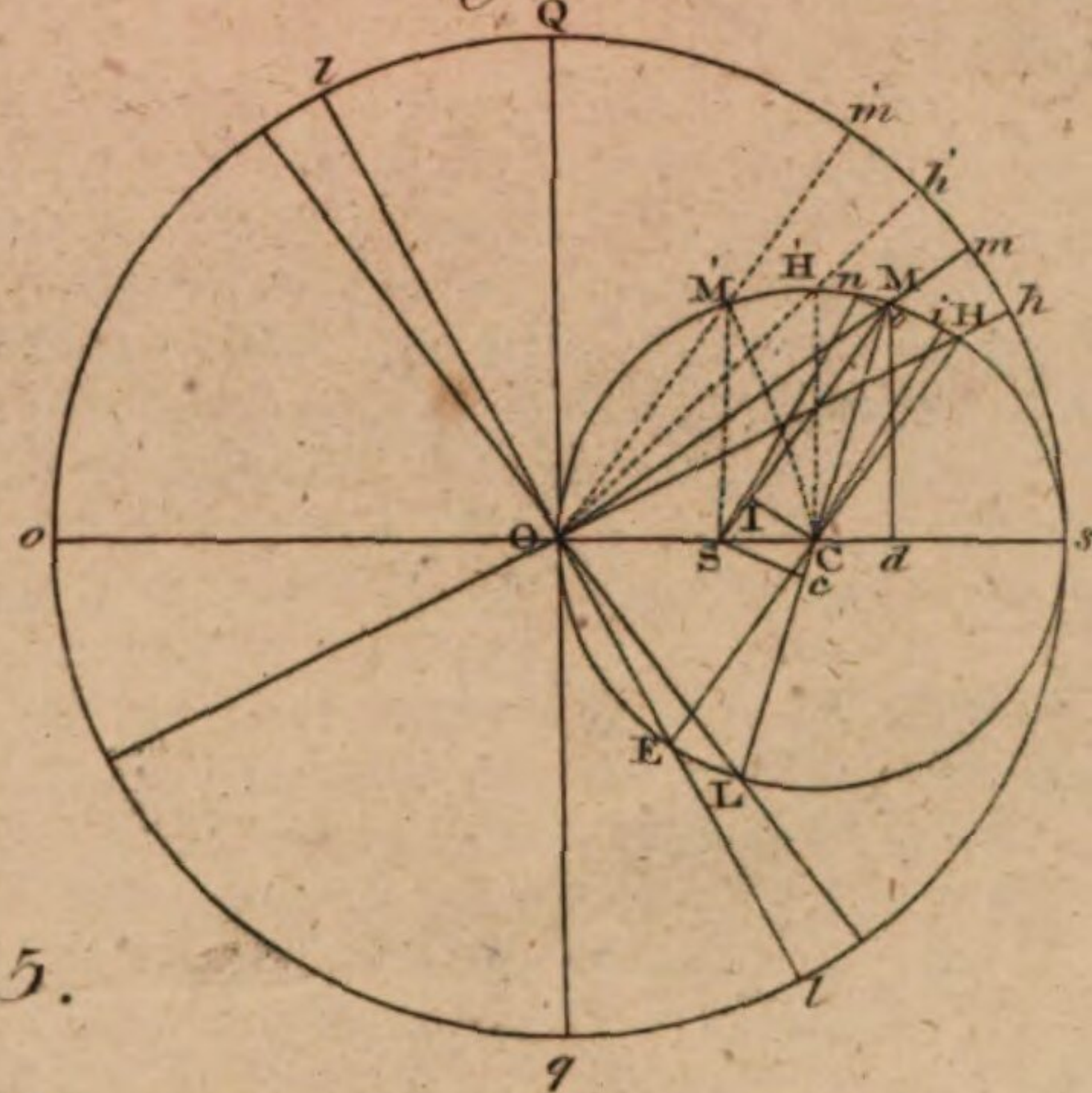


Fig. 5.

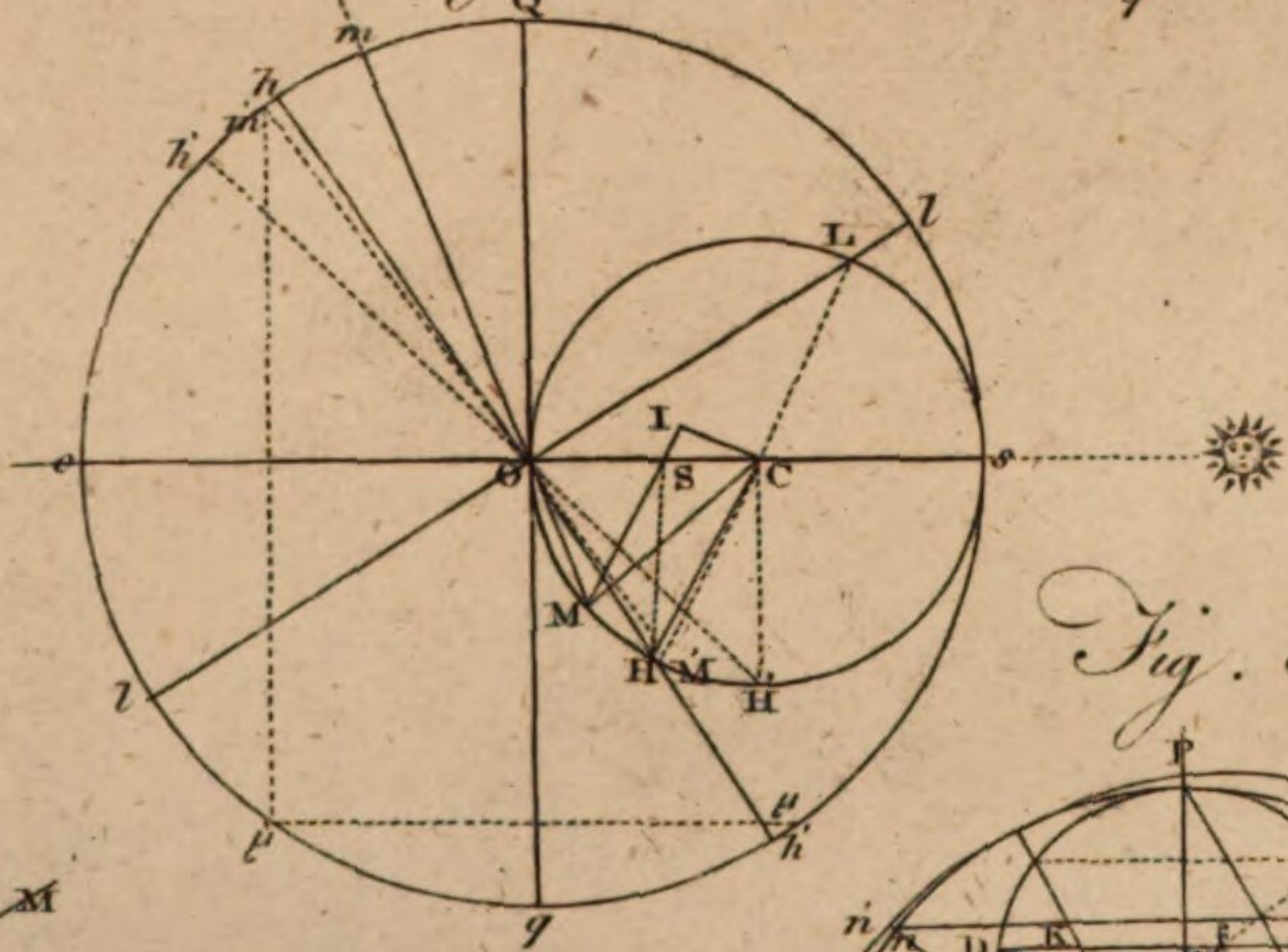


Fig. ^M 6.

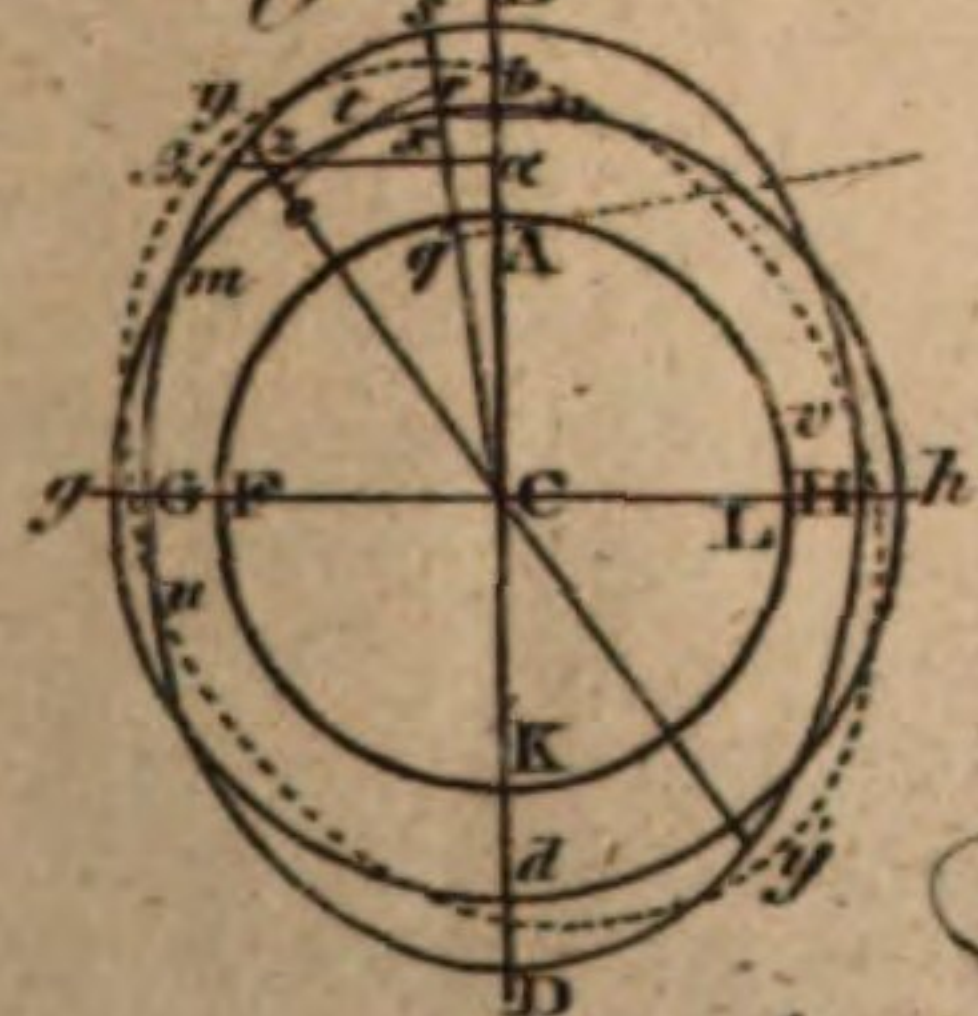


Fig. 7.

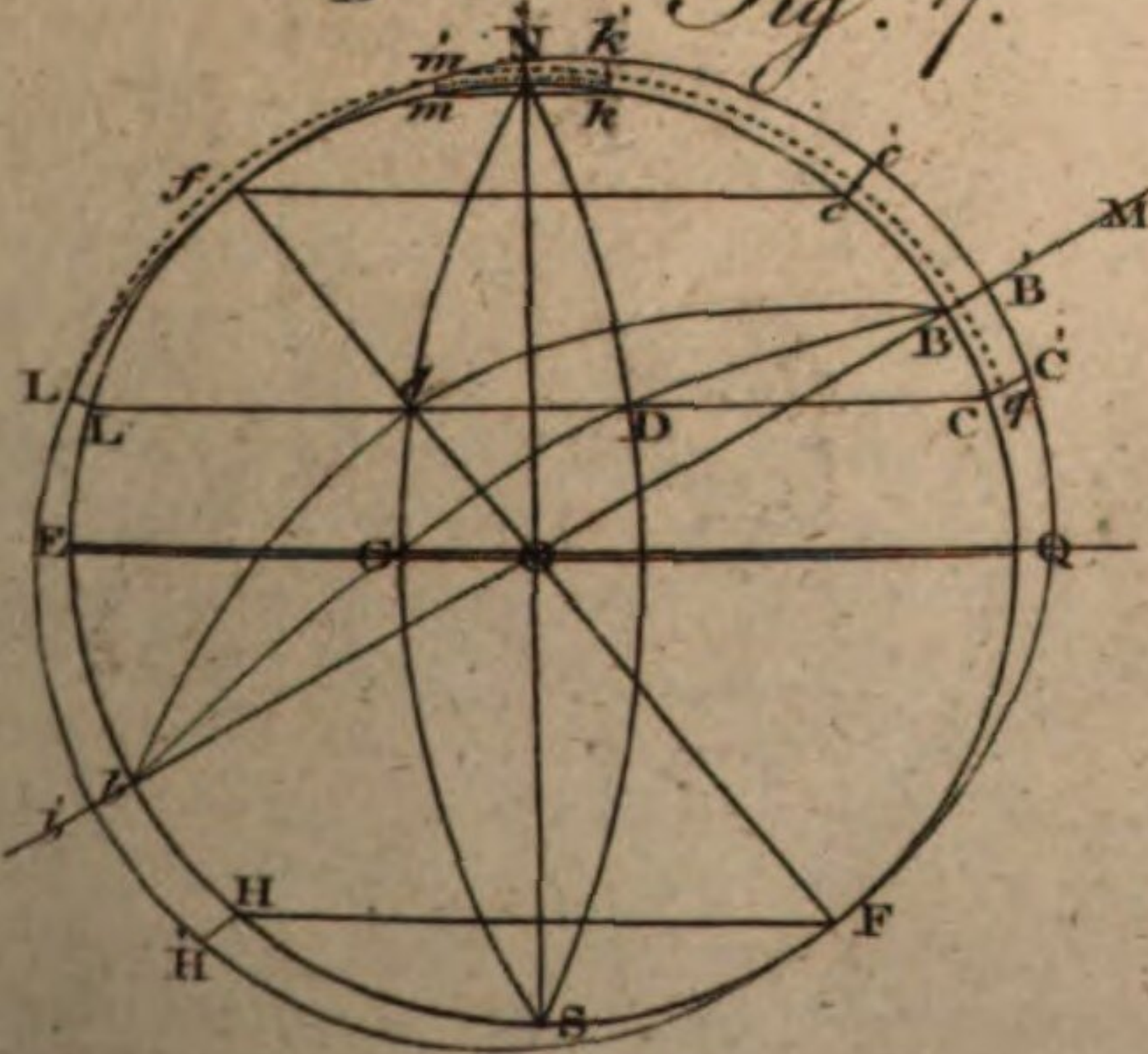
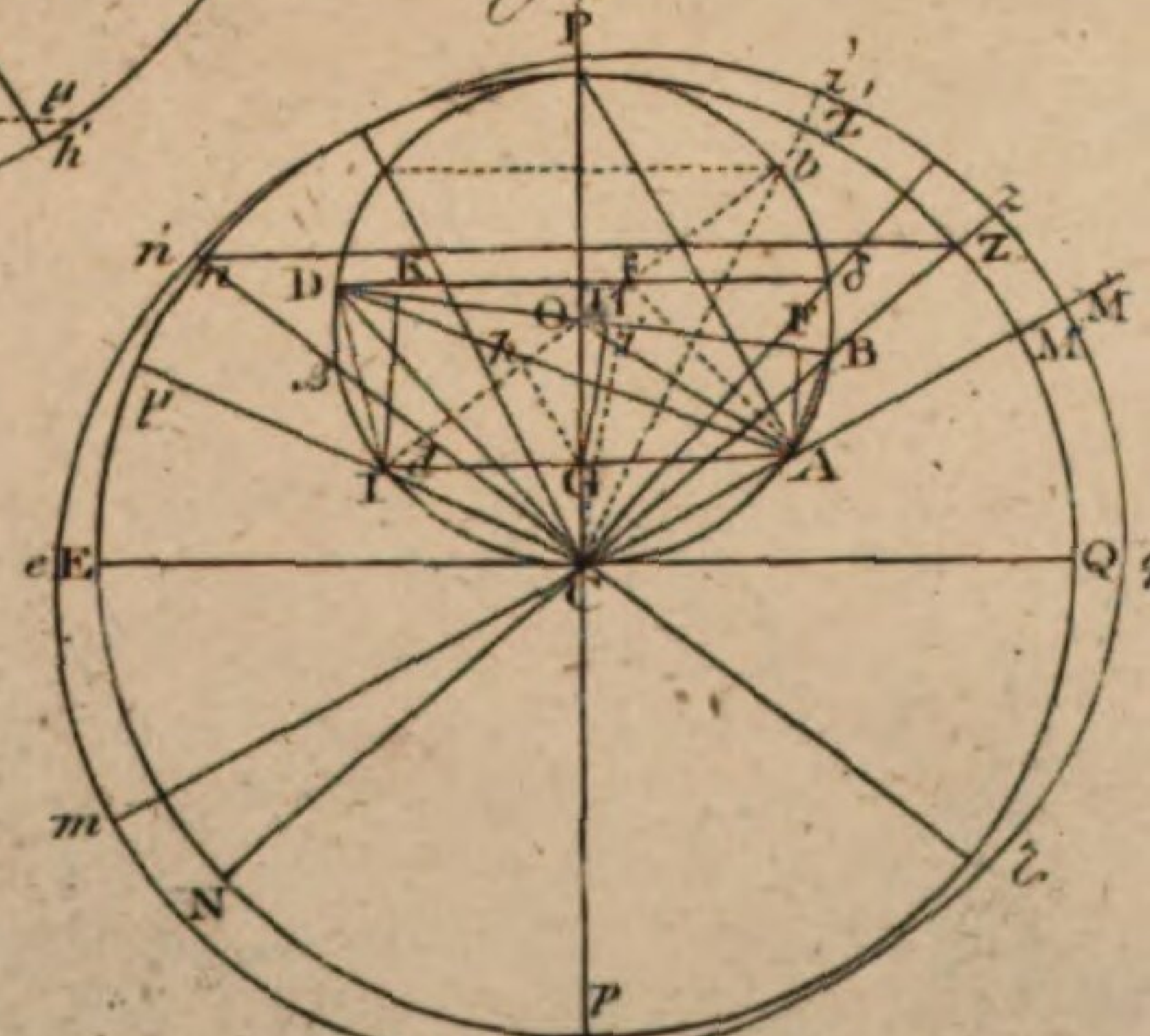


Fig. 8.



Tide.

Tide.

But in order to ascertain the effects of declination and latitude on other tides, we must make a much more complicated construction, even tho' we suppose both luminaries in the ecliptic. For in this case the two depressed poles of the watery spheroid are not in the poles of the earth; and therefore the sections of the ocean, made by meridians, are by no means ellipses.

In a neap tide, the moon is vertical at B (fig. 7. or 8.), and the sun at some point of fF , 90° from B. If O be this point, the construction for the heights of the tides may be made by adding to both the superior and inferior tides for any point D, the quantity $M + S - D'F$ or $DK \times \sin^2 dO = M + S - \text{tide} \times \frac{\sin^2 2Q}{\cos^2 MQ}$, as is evident.

But if the sun be vertical at d , d will be the highest part of the circle fOF , and no correction is necessary. But in this case the circle of high water will be inclined to the meridian in an angle equal to dBO (fig. 7.), and neither the times nor elevations of high water will be properly ascertained, and the error in time may be considerable in high latitudes.

The inaccuracies are not so great in intermediate tides, and respect chiefly the time of high water and the height of low water.

The exact computation is very tedious and peculiar, so that it is hardly possible to give any account of a regular progress of phenomena; and all we can do is, to ascertain the precise heights of detached points. For which reasons, we must content ourselves with the construction already given. It is the exact geometrical expression of Bernoulli's analysis, and its consequences now related contain all that he has investigated. We may accommodate it very nearly to the real state of things, by supposing PC equal, not to CO of fig. 4. but to MS, exhibiting the whole compound tide. And the point B, instead of representing the moon's place, must represent the place of high water,

Thus have we obtained a general, though not very accurate, view of the phenomena which must take place in different latitudes and in different declinations of the sun and moon, provided that the physical theory which determines the form and position of the watery spheroid be just. We have only to compute, by a very simple process of spherical trigonometry, the place of the pole of this spheroid. The second construction, in fig. 8. shows us all the circumstances of the time and height of high water at any point. It will be recollected, that in computing this place of the pole, the anticipation of 20 degrees, arising from the inertia of the waters, must be attended to.

Were we to institute a comparison of this theory with observation, without farther consideration, we should still find it unfavourable, partly in respect of the heights of the tides, and more remarkably in respect of the time of low water. We must again consider the effects of the inertia of the waters, and recollect, that a regular theoretical tide differs very little in its progress from the motion of a wave. Even along the free ocean, its motion much resembles that of any other wave. All waves are propagated by an oscillatory motion of the waters, precisely similar to that of a pendulum. It is well known, that if a pendulum receive a small impulse in the time of every descent, its vibrations may be increased to infinity. Did the successive actions of the sun or moon just keep time with the natural propagation of the tides, or the natural oscillations of the waters, the tides would also augment to infinity: But there is an infinite odds against this exact adjustment. It is much more probable that the action of to-day interrupts or checks the oscillation produced by yesterday's action, and that the motion which we perceive in this day's tide is what remains,

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and is compounded with the action of to-day. This being the case, we should expect that the nature of any tide will depend much on the nature of the preceding tide. Therefore we should expect that the superior and inferior tides of the same day will be more nearly equal than the theory determines. The whole course of observation confirms this. In latitude 45° , the superior and inferior tides of one day may differ in the proportion of $2\frac{1}{2}$ to 1, and the tides corresponding to the greatest and least declinations of the moon may differ nearly as much. But the difference of the superior and inferior tides, as they occur in the list of Observations at Rochefort, is not the third part of this, and the changes made by the moon's declination is not above one-half. Therefore we shall come much nearer the true measure of a spring tide, by taking the arithmetical mean, than by taking either the superior or inferior.

We should expect less deviation from the theory in the gradual diminution of the tides from spring tide to neap tide, and in the gradual changes of the medium tide by the declination of the moon; because the successive changes are very small; and when they change in kind, that is, diminish after having for some time augmented, the change is by insensible degrees. This is most accurately confirmed by observation. The vast collection made by Cassini of the Observations at Brest being examined by Bernoulli, and the medium of the two tides in one day being taken for the tide of that day, he found such an agreement between the progression of these medium tides and the progression of the lines MS of fig. 4. that the one seemed to be calculated by the other. He found no less agreement in the changes of the medium tides by the moon's declination.

In like manner, the changes produced by the different distances of the moon from the earth, were found abundantly conformable to the theory, although not so exact as the other. This difference or inferiority is easily accounted for: When the moon changes in her mean distance, one of the neap tides is uncommonly small, and therefore the successive diminutions are very great, and one tide sensibly affects another. The same circumstance operates when she changes in apogee, by reason of a very large spring tide. And the changes corresponding both to the sun's distance from the earth and his declination agreed almost exactly.

All these things considered together, we have abundant reason to conclude, that not only the theory itself is just in principle (a thing which no intelligent naturalist can doubt), but also that the data which are assumed in the application are properly chosen; that is, that the proportion of 2 to 5 is very nearly the true proportion of the mean solar and lunar forces. If we now compute the medium tide for any place in succession, from spring tide to neap tide, and still more, if we compute the series of times of their occurrence, we shall find as great an agreement as can be desired. Not but that there are many irregularities; but these are evidently so anomalous, that we can ascribe them to nothing but circumstances which are purely local.

This general rule of computation must be formed in the following manner:

The spring tide, according to theory, being called A, and the neap tide B, recollect that the spring tide, according to the regular theory, is measured by $M + S$. Recollect also, that when the lunar tide only is considered, the superior spring tide is $M \times \sin^2 ZM$ (fig. 8). But when we consider the action of two adjoining tides on each other, we find it safer to take the medium of the superior and inferior tides for the measure; and this is $M \times \frac{1 + \cos^2 2ZQ \times \cos^2 2MQ}{2}$. Let this be called m . This

3 X

being

Tide. being totally the effect of M as modified by latitude and declination, may be taken as its proper measure, by which we are to calculate the other tides of the monthly series from spring tide to neap tide.

In like manner, we must compute a value for S , as modified by declination and latitude; call this s . Then say,

$$M + S : A = m + s : A \times \frac{m + s}{M + S}$$

This fourth proportional will give the spring tide as modified for the given declination of the luminaries, and the latitude of the place.

Now recollect, that the medium tide, when the luminaries are in the equator, is $A \times \cos^2 \text{lat.}$ Therefore let F be the spring tide *observed* at any place when the luminaries are in the equator; and let this be the medium of a great many observations made in these circumstances. This gives $A \cdot \cos^2 \text{lat.}$ (as modified by the peculiar circumstances of the place) $= F$. Therefore the fourth proportional now given changes to $F \times \frac{m + s}{M + S \cdot \cos^2 \text{lat.}}$ And

a similar substitute for B is $G \times \frac{m - s}{M - S \cdot \cos^2 \text{lat.}}$

Lastly, To accommodate our formulæ to every distance of the earth from the sun and moon, let D and Δ be the mean distances of the sun and moon, and d and δ their distances at the given time; and then the two substitutes become

$$\frac{\Delta^3 d^3 M + \delta^3 D^3 S}{d^3 \delta^3 (M + S)} \times F \times \frac{m + s}{(M + S) \cos^2 \text{lat.}}$$

$$\frac{\Delta^3 d^3 M - \delta^3 D^3 S}{d^3 \delta^3 (M - S)} \times G \times \frac{m - s}{(M - S) \cos^2 \text{lat.}}$$

The half sum of these two quantities will be the MC , and their half difference will be the SC , of fig. 4. with which we may now operate, in order to find the tide for any other day of the menstrual series, by means of the elongation a of the moon from the sun; that is, we must say $MC + CS :$

$MC - CS = \tan. a : \tan. b$; then $x = \frac{a + b}{2}$, and $y = \frac{a - b}{2}$. And MS , the height of the tide, is $MC \times \cos. 2y + CS \times \cos. 2x$.

SUCH is the general theory of the tides, deduced from the principle of universal gravitation, and adjusted to that proportion of the solar and lunar forces which is most consistent with other celestial phenomena. The comparison of the greatest and least daily retardations of the tides was with great judgment preferred to the proportion of spring and neap tides, selected by Sir Isaac Newton for this purpose. This proportion must depend on many local circumstances. When a wave or tide comes to the mouths of two rivers, and sends a tide up each, and another tide of half the magnitude comes a fortnight after; the proportion of tides sent up to any given places of these rivers may be extremely different. Nay, the proportion of tides sent up to two distant places of the same river can hardly be the same; nor are they the same in any river that we know. It can be demonstrated, in the strictest manner, that the farther we go up the river, where the declivity is greater, the neap tide will be smaller in proportion to the spring tide. But it does not appear that the time of succession of the different tides will be much affected by local circumstances. The tide of the second day of the moon being very little less than that of the first, will be nearly as much retarded, and the intervals between their arrivals cannot be very different from the real intervals of the undisturbed tides; accordingly, the succession of the highest to the highest but one is

found to be the same in all places, when not disturbed by *different* winds. In like manner, the succession of the lowest and the lowest but one is found equally invariable; and the highest and the lowest tides observed in any place *must* be accounted the spring and neap tides of that place, whether they happen on the day of full and half moon or not. Nay, we can see here the explanation of a general deviation of the theory which we formerly noticed. A low tide, being less able to overcome obstructions, will be sooner stopped, and the neap tides should happen a little earlier than by the undisturbed theory.

With all these corrections, the theory now delivered will be found to correspond, with observation, with all the exactness that we can reasonably expect. We had an opportunity of comparing it with the phenomena in a place where they are very singular, viz. in the harbour of Biffstedt in Iceland. The equator of the watery spheroid frequently passes through the neighbourhood of this place, in a variety of positions with respect to its parallel of diurnal revolution, and the differences of superior and inferior tides are most remarkable and various. We found a wonderful conformity to the most diversified circumstances of the theory.

There is a period of 18 years, respecting the tides in Iceland, taken notice of by the ancient Saxons; but it is not distinctly described. Now this is the period of the moon's nodes, and of the greatest and least inclination of her orbit to the equator. It is therefore the period of the positions of the equator of the tides which ranges round this island, and very sensibly affects them.

Hitherto we have supposed the tides to be formed on an ocean completely covering the earth. Let us see how those may be determined which happen in a small and confined sea, such as the Caspian or the Black Sea. The determination in this case is very simple. As no supply of water is supposed to come into the basin, it is susceptible of a tide only by sinking at one end and rising at the other. This may be illustrated by fig. 6. where Cx , Cy , are two perpendicular planes bounding a small portion of the natural ocean. The water will sink at z and rise at x , and form a surface otr parallel to the equilibrated surface ys . It is evident that there will be high water, or the greatest possible rise at r , when the basin comes to that position where the tangent is most of all inclined to the diameter. This will be when the angle tCB is 45° nearly, and therefore three lunar hours after the moon's southing; at the same time, it will be low water at the other end. It is plain that the rise and fall must be exceedingly small, and that there will be no change in the middle. The tides of this kind in the Caspian Sea, in latitude 45° , whose extent in longitude does not exceed eight degrees, are not above seven inches; a quantity so small, that a slight breeze of wind is sufficient to check it, and even to produce a rise of the waters in the opposite direction. We have not met with any accounts of a tide being observed in this sea.

It should be much greater, though still very small, in the Mediterranean Sea. Accordingly, tides are observed there, but still more remarkably in the Adriatic, for a reason which will be given by and by. We do not know that tides have been observed in the great lakes of North America. These tides, though small, should be very regular.

Should there be another great basin in the neighbourhood of zx , lying east or west of it, we should observe a curious phenomenon. It would be low water on one side of the shore z when it is high water on the other side of this partition. If the tides in the Euxine and Caspian Seas, or in the American lakes which are near each other, could be observed, this phenomenon should appear, and would be one of the prettiest examples of universal gravitation that can be

Tide. be conceived. Something like it is to be seen at Gibraltar. It is high water on the east side of the rock about 10 o'clock at full and change, and it is high water on the west side, not a mile distant, at 12. This difference is perhaps the chief cause of the singular current which is observed in the Straits mouth. There are three currents observed at the same time, which change their directions every 12 hours. The small tide of the Mediterranean proceeds along the Barbary shore, which is very uniform all the way from Egypt, with tolerable regularity. But along the northern side, where it is greatly obstructed by Italy, the islands, and the east coast of Spain, it sets very irregularly; and the perceptible high water on the Spanish coast differs four hours from that of the southern coast. Thus it happens, that one tide ranges round Europa point, and another along the shore near Ceuta, and there is a third current in the middle different from both. Its general direction is from the Atlantic Ocean into the Mediterranean Sea, but it sometimes comes out when the ebb tide in the Atlantic is considerable.

Suppose the moon over the middle of the Mediterranean. The surface of the sea will be level, and it will be half tide at both ends, and therefore within the Straits of Gibraltar. But without the Straits it is within half an hour of high water. Therefore there will be a current setting in from the Atlantic. About three and an half hours after, it is high water within and half ebb without. The current now sets out from the Mediterranean. Three hours later, it is low water without the Straits and half ebb within; therefore the current has been setting out all this while. Three hours later, it is half flood without the Straits and low water within, and the current is again setting in, &c.

Were the earth fluid to the centre, the only sensible motion of the waters would be up and down, like the waves on the open ocean, which are not brushed along by strong gales. But the shallowness of the channel makes a horizontal motion necessary, that water may be supplied to form the accumulation of the tide. When this is formed on a flat shelving coast, the water must flow in and out, on the flats and sands, while it rises and falls. These horizontal motions must be greatly modified by the channel or bed along which they move. When the channel contracts along the line of flowing water, the wave, as it moves up the channel, and is checked by the narrowing shores, must be reflected back, and keep a-top of the waters still flowing in underneath. Thus it may rise higher in these narrow seas than in the open ocean. This may serve to explain a little the great tides which happen on some coasts, such as the coast of Normandy. At St Malo the flood frequently rises 50 feet. But we cannot give any thing like a full or satisfactory account of these singularities. In the Bay of Fundy, and particularly at Annapolis Royal, the water sometimes rises above 100 feet. This seems quite inexplicable by any force of the sun and moon, which cannot raise the waters of the free ocean more than eight feet. These great floods are unquestionably owing to the proper timing of certain oscillations or currents adjoining, by which they unite, and form one of great force. Such violent motions of water are frequently seen on a small scale in the motions of brooks and rivers; but we are too little acquainted with hydraulics to explain them with any precision.

We have seen that there is an oscillation of waters formed under the sun and moon; and that in consequence of the rotation of the earth, the inertia and the want of perfect fluidity of the waters, and obstructions in the channel, this accumulation never reaches the place where it would finally

settle if the earth did not turn round its axis. The consequence of this must be a general current of the waters from east to west. This may be seen in another way. The moon in her orbit round the earth has her gravity to the earth diminished by the sun's disturbing force, and therefore moves in an orbit less incurvated than she would describe independent of the sun's action. She therefore employs a longer time. If the moon were so near the earth as almost to touch it, the same thing would happen. Therefore suppose the moon turning round the earth, almost in contact with the equator, with her natural undisturbed periodic time, and that the earth is revolving round its axis in the same time, the moon would remain continually above the same spot of the earth's surface (suppose the city of Quito), and a spectator in another planet would see the moon always covering the same spot. Now let the sun act. This will not affect the rotation of the earth, because the action on one part is exactly balanced by the action on another. But it will affect the moon. It will move more slowly round the earth's centre, and at a greater distance. It will be left behind by the city of Quito, which it formerly covered. And as the earth moves round from west to east, the moon, moving more slowly, will have a motion to the west with respect to Quito. In like manner, every particle of water has its gravity diminished, and its diurnal motion retarded; and hence arises a general motion or current from east to west. This is very distinctly perceived in the Atlantic and Pacific Oceans. It comes round the Cape of Good Hope, ranges along the coast of Africa, and then sets directly over to America, where it meets a similar stream which comes in by the north of Europe. Meeting the shores of America, it is deflected both to the south along the coast of Brazil, and to the north along the North American shores, where it forms what is called the *Gulf Stream*, because it comes from the Gulf of Mexico. This motion is indeed very slow, this being sufficient for the accumulation of seven or eight feet on the deep ocean; but it is not altogether insensible.

We may expect differences in the appearances on the western shores of Europe and Africa, and on the western shore of America, from the appearances on the eastern coasts of America and of Asia, for the general current obstructs the waters from the western shores, and sends them to the eastern shores. Also when we compare the wide opening of the northern extremity of the Atlantic Ocean with the narrow opening between Kamtschatka and America, we should expect differences between the appearances on the west coasts of Europe and of America. The observations made during the circumnavigations of Captain Cook and others show a remarkable difference. All along the west coast of North America the inferior tide is very trifling, and frequently is not perceived.

In the very same manner, the disturbing forces of the sun and moon form a tide in the fluid air which surrounds this globe, consisting of an elevation and depression, which move gradually from east to west. Neither does this tide ever attain that position with respect to the disturbing planets which it would do were the earth at rest on its axis. Hence arises a motion of the whole air from east to west; and this is the principal cause of the trade-winds. They are a little accelerated by being heated, and therefore expanding. They expand more to the westward than in the opposite direction, because the air expands on that side into air, which is now cooling and contracting. These winds very evidently follow the sun's motion, tending more to the south or north as he goes south or north. Were this motion considerably affected by the expansion of heated air, we should find the air rather coming northward and southward from the torrid

Tide. zone, in consequence of its expansion in that climate. We repeat it, it is almost solely produced by the aerial tide, and is necessary for the very formation of this tide. We cannot perceive the accumulation. It cannot affect the barometer, as many think, because, though the air becomes deeper, it becomes deeper only because it is made lighter by the gravitation to the sun. Instead of pressing more on the cistern of the barometer, we imagine that it presses less; because, like the ocean, it never attains the height to which it tends. It remains always too low for equilibrium, and therefore it should press with less force on the cistern of a barometer.

There is an appearance precisely similar to this in the planet Jupiter. He is surrounded by an atmosphere which is arranged in zones or belts, probably owing to climate differences of the different latitudes, by which each seems to have a different kind of sky. Something like this will appear to a spectator in the moon looking at this earth. The general weather and appearance of the sky is considerably different in the torrid and temperate zones. Jupiter's belts are not of a constant shape and colour; but there often appear large spots or tracts of cloud, which retain their shape during several revolutions of Jupiter round his axis. To judge of his rotation by one of these, we should say that he turns round in 9.55. There is also a brighter spot which is frequently seen, occupying one certain situation on the body of Jupiter. This is surely adherent to his body, and is either a bright coloured country, or perhaps a tract of clouds hovering over some volcano. This spot turns round in 9.51 $\frac{1}{4}$. And thus there is a general current in his atmosphere from east to west.

Both the motion of the air and of the water tend to diminish the rotation of the earth round its axis: for they move slower than the earth, because they are retarded by the luminaries. They must communicate this retardation to the earth, and must take from it a quantity of motion precisely equal to what they want, in order to make up the equilibrated tide. In all probability this retardation is compensated by other causes; for no retardation can be observed. This would have altered the length of the year since the time of Hipparchus, giving it a smaller number of days. We see causes of compensation. The continual washing down of soil from the elevated parts of the earth must produce this effect, by communicating to the valley on which it is brought to rest the excess of diurnal velocity which it had on the mountain top.

While we were employed on this article, a book was put into our hands called *Studies of Nature*, by a Mr Saint Pierre. This author scouts the Newtonian theory of the tides, as erroneous in principle, and as quite insufficient for explaining the phenomena; and he ascribes all phenomena of the tides to the liquefaction of the ices and snows of the circumpolar regions, and the greater length of the polar than of the equatorial axis of the earth. He is a man of whom we wish to speak with respect, for his constant attention to final causes, and the proof thence resulting of the wisdom and goodness of God. For this he is entitled to the greater praise, that it required no small degree of fortitude to resist the influence of national example, and to retain his piety in the midst of a people who have drunk the very dregs of the atheism of ancient Greece. This is a species of merit rarely to be met with in a Frenchman of the present day; but as a philosopher, M. de St Pierre can lay claim to no other merit except that of having collected many important facts. The argument which he employs to prove that the earth is a prolate spheroid, is a direct demonstration of the truth of the contrary opinion; and the melting of the ice and snows at the poles cannot produce the

smallest motion in the waters. Were there even 10 times more ice and snow floating on the northern sea than there is, and were it all to melt in one minute, there would be no flux from it; for it would only fill up the space which it formerly occupied in the water. Of this any person will be convinced, who shall put a handful of snow squeezed hard into a jar of water, and note the exact height of the water. Let the snow melt, and he will find the water of the same height as before.

TIDE-Waiters, or *Tidesmen*, are inferior officers belonging to the customhouse, whose employment is to watch or attend upon ships until the customs be paid: they get this name from their going on board ships on their arrival in the mouth of the Thames or other ports, and so come up with the tide.

TIEND, in Scots law. See **TEIND**.

TIERCE, or **TEIRCE**, a measure of liquid things, as wine, oil, &c. containing the third part of a pipe, or 42 gallons.

TIERCED, in heraldry, denotes the shield to be divided by any part of the partition-lines, as party, coupy, tranchy, or tailly, into three equal parts of different colours or metals.

TIGER, in zoology. See **FELIS**.

TIGER-Wolf, the name by which the hyæna is called at the Cape of Good Hope. See **HYÆNA**.

TIGRIS, a river of Asia, which has its source near that of the Euphrates in the mountain Tchildir in Turkomania: afterwards it separates Diarbeck from Erzerum, and Khustan from Irac-Arabia; and uniting with the Euphrates at Gorno, it falls into the gulf of Bassorah, under the name of *Schat el-Arab*. This river passes by Diarbekar, Gezira, Mousul, Bagdad, Gorno, and Bassorah.

TILIA, **LIME** or **LINDEN-TREE**, in botany: A genus of plants belonging to the class of *polyandria*, and order of *monogynia*; and in the natural system ranging under the *Columniferae*. The calyx is quinquepartite; the corolla pentapetalous; the berry is dry, globose, quinquelocular, quinquevalve, and opening at the base. There are four species; the europæa and americana, pubescens and alba.

The *europæa*, or common lime-tree, is generally supposed to be a native of Britain; but we are informed by Mr Coxe's Travels in Switzerland, vol. ii. p. 64. Coxe, that Mr Pennant told him (on what authority is not mentioned), that it was imported into England before the year 1652.

The leaves are heart-shaped, with the apex produced, and serrated on the edges; the flowers grow in a thin umbel, from three to nine together, of a whitish colour and a fragrant smell; very grateful to bees. The wood is light, smooth, and of a spongy texture, used for making lasts and tables for shoemakers, &c. Ropes and bandages are made of the bark, and mats and rustic garments of the inner rind, in Carniola and some other countries.—The lime-tree contains a gummy juice, which being repeatedly boiled and clarified produces a substance like sugar.

TILLEMONT (Sebastian le Nain de). See **NAIN**.

TILLER of a *SHIP*, a strong piece of wood fastened in the head of the rudder, and in small ships and boats called the *helm*.

TILLÆA, in botany: A genus of plants belonging to the class of *tetrandria*, the order of *tetragynia*, and in the natural system ranging under the 13th order, *Succulentæ*. The calyx has three or four divisions; the petals are three or four, and equal; the capsules three or four, and polyspermous. There are four species; of which one only, the *muscosa*, is a native of England, and is not mentioned among the Scotch plants.

The *muscosa*, or procumbent tillœa, has prostrate stems, almost

Tillotson. almost erect, generally red, and grow longer after flowering. The parts of fructification are always three. The leaves grow in pairs, and are fleshy. It is found on dry heaths in Norfolk and Suffolk, and flowers in May and June.

TILLOTSON (John), a celebrated archbishop of Canterbury, was the son of Robert Tillotson of Sowerby, in the parish of Hallifax in Yorkshire, clothier; and was born there in the year 1630. He studied in Clare-hall, Cambridge; and in 1656 left this college, in order to become tutor to the son of Edmund Prideaux, Esq; of Ford-abbey in Devonshire. He was afterwards curate to Dr Hacket vicar of Cheshunt, in Hertfordshire. In 1663, he was presented by Sir Thomas Barnardiston to the rectory of Ketton or Keddington in the county of Suffolk; but was the next year chosen preacher to Lincoln's Inn, when he procured Ketton to be bestowed on his curate. He was greatly admired in London for his sermons; and in the same year was chosen Tuesday-lecturer at St Lawrence's church, London, where his lectures were frequented by all the divines of the city, and by many persons of quality and distinction. In 1666, he took the degree of Doctor of Divinity at Cambridge; in 1669, was made prebendary of Canterbury; in 1672, was admitted dean of that cathedral; and three years after, was made a prebendary of St Paul's cathedral, London. In 1679, he became acquainted with Charles earl of Shrewsbury, whom he converted from Popery; and the next year refused to sign the clergy of London's address of thanks to king Charles II. for not agreeing to the bill of exclusion of the duke of York. In 1683, he visited the unhappy Lord Ruffel when under condemnation; and attended him in his last moments on the scaffold. In 1689, he was installed dean of St Paul's; made clerk of the closet to King William and Queen Mary; and appointed one of the commissioners to prepare matters to be laid before the convocation, in order to a comprehension of all Protestants, as well dissenters as churchmen; but this attempt was frustrated by the zeal of those members of that body, who refused to admit of any alteration in things confessedly indifferent. In 1691, Dr Tillotson was, notwithstanding the warmest remonstrances and intreaties on his part, consecrated archbishop of Canterbury, and four days after was sworn one of the privy council; their majesties always reposing an entire confidence in his prudence, moderation, and integrity. In 1694, he was seized with a dead palsy, of which he died in the 65th year of his age. He was interred in the church of St Lawrence Jury, London, where a handsome monument is erected to his memory. This learned and pious divine, while living, was greatly inveighed against by the enemies of the revolution. After his death there was found a bundle of bitter libels which had been published against him, on which he had written with his own hand, "I forgive the authors of these books, and pray God that he may also forgive them." It is remarkable, that while this truly great man was in a private station, he always laid aside two-tenths of his income for charitable uses. One volume in folio of Dr Tillotson's sermons was published in his life-time, and corrected by his own hand; these Barbeyrac translated into French. Those which came abroad after his death, from his chaplain Dr Barker, made two volumes in folio, the copy of which was sold for 2500 l. and this was the only legacy he left to his family, his extensive charity having consumed his yearly revenues as constantly as they came to his hands. However, King William gave two grants to his widow; the first of which was an annuity of 400 l. during the term of her natural life, and the second of 200 l. as an addition to the former annuity. Dr Tillotson wrote some other works besides his Sermons; and also published Dr

Barrow's works, and Dr Wilkins's Treatise of the Principles and Duties of Natural Religion, and a volume of that divine's Sermons.

TIMBER, wood fit for building, &c. See **TREE**, and **STRENGTH of Materials**.

TIMBERS, the ribs of a ship, or the incurvated pieces of wood, branching outward from the keel in a vertical direction, so as to give strength, figure, and solidity, to the whole fabric. See **SHIP-BUILDING**, book i. ch. ii.

TIME, a succession of phenomena in the universe, or a mode of duration marked by certain periods or measures, chiefly by the motion and revolution of the sun.

The general idea which time gives in every thing to which it is applied, is that of limited duration. Thus we cannot say of the Deity, that he exists in time; because eternity, which he inhabits, is absolutely uniform, neither admitting limitation nor succession. See **METAPHYSICS**, n^o 209.

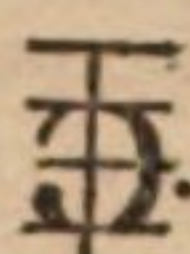
TIME, in music, is an affection of sound, by which it is said to be long or short, with regard to its continuance in the same tone or degree of tune.

Musical time is distinguished into *common or duple time*, and *triple time*.

Double, duple, or common time, is when the notes are in a duple duration of each other, viz. a semibreve equal to two minims, a minim to two crotchets, a crotchet to two quavers, &c.

Common or double time is of two kinds. The first when every bar or measure is equal to a semibreve, or its value in any combination of notes of a less quantity. The second is where every bar is equal to a minim, or its value in less notes. The movements of this kind of measure are various, but there are three common distinctions; the first *slow*, denoted at the beginning of the line by the mark

C; the second *brisk*, marked thus ; and the third *very*

brisk, thus marked .

Triple time is when the durations of the notes are triple of each other, that is, when the semibreve is equal to three minims, the minim to three crotchets, &c. and it is marked T.

TIME-Keepers, or *Instruments for measuring Time*. See **CLOCK**, **DIAL**, **WATCH**, &c.

Harrison's TIME-Keeper. See **HARRISON** and **LONGITUDE**.

TIMOLEON, a celebrated Corinthian general, who restored the Syracusians to their liberty, and drove the Carthaginians out of Sicily. See **SYRACUSE**, n^o 50—54.

TIMON the *Sceptic*, who is not to be confounded with Timon the *Misanthrope*, was a Phliasian, a disciple of Pyrrho, and lived in the time of Ptolemy Philadelphus. He took so little pains to invite disciples to his school, that it has been said of him, that as the Scythians shot flying, Timon gained pupils by running from them. He was fond of rural retirement; and was so much addicted to wine, that he held a successful contest with several celebrated champions in drinking. Like Lucian, he wrote with sarcastic humour against the whole body of philosophers. The fragments of his satirical poem *Silli*, often quoted by the ancients, have been carefully collected by Henry Stephens in his *Poesis Philosophica*. Timon lived to the age of 90 years.

TIMON, surnamed *Misanthropos*, or the *Man-bater*, a famous Athenian, who lived about 420 B. C. He was one day asked, why he loved the young Alcibiades while he detested all the rest of the human race? on which he replied, "It is because I foresee that he will be the ruin of the Athenians."

Timber
||
Timon.

Timor, nians." He carefully avoided all sorts of company; yet **Timotheus** went one day to an assembly of the people, and cried with a loud voice, "That he had a fig-tree on which several persons had hanged themselves; but as he intended to cut it down, in order to build a house on the place where it stood, he gave them notice of it, that if any of them had a mind to hang themselves, they must make haste and do it speedily." He had an epitaph engraved on his tomb, filled with imprecations against those who read it. Shakespeare has formed tragedy on his story.

TIMOR, an island of Asia, in the East-Indian sea, to the south of the Moluccas, and to the east of the island of Java, being 150 miles in length, and 37 in breadth. It abounds in sandal-wood, wax, and honey; and the Dutch have a fort here. The inhabitants are Pagans, and are little better than savages; and some pretend they had not the use of fire many years ago.

TIMOTHEUS, one of the most celebrated poet-musicians of antiquity, was born at Miletus, an Ionian city of Caria, 446 years B. C. He was contemporary with Philip of Macedon and Euripides; and not only excelled in lyric and dithyrambic poetry, but in his performance upon the cithara. According to Pausanias, he perfected that instrument by the addition of four new strings to the seven which it had before; though Suidas says it had nine before, and that Timotheus only added two, the 10th and 11th, to that number. See **LYRE**.

With respect to the number of strings upon the lyre of Timotheus: The account of Pausanias and Suidas is confirmed in the famous *senatus-consultum* against him, still extant, preserved at full length in Boethius. Mr Stillingfleet has given an extract from it, in proof of the simplicity of the ancient Spartan music. The fact is mentioned in Athenæus; and Casaubon, in his notes upon that author, has inserted the whole original text from Boethius, with corrections. The following is a faithful translation of this extraordinary Spartan act of parliament. "Whereas Timotheus the Milesian, coming to our city, has dishonoured our ancient music, and, despising the lyre of seven strings, has, by the introduction of a greater variety of notes, corrupted the ears of our youth; and by the number of his strings, and the novelty of his melody, has given to our music an effeminate and artificial dress, instead of the plain and orderly one in which it has hitherto appeared; rendering melody infamous, by composing in the chromatic instead of the enharmonic: ————— The kings and the ephori have therefore resolved to pass censure upon Timotheus for these things: and, farther, to oblige him to cut all the superfluous strings of his eleven, leaving only the seven tones; and to banish him from our city; that men may be warned for the future not to introduce into Sparta any unbecoming custom." ———

The same story, as related in Athenæus, has this additional circumstance, That when the public executioner was on the point of fulfilling the sentence, by cutting off the new strings, Timotheus, perceiving a little statue in the same place, with a lyre in his hand of as many strings as that which had given the offence, and showing it to the judges, was acquitted.

It appears from Suidas, that the poetical and musical compositions of Timotheus were very numerous, and of various kinds. He attributes to him 19 nomes, or canticles, in hexameters; 36 proems, or preludes; 18 dithyrambics; 21 hymns; the poem in praise of Diana; one panegyric; three tragedies, the Persians, Phinidas, and Laertes; to which must be added a fourth, mentioned by several ancient authors, called *Niobe*, without forgetting the poem on the birth of Bacchus. Stephen of Byzantium makes him author

of 18 books of nomes, or airs, for the cithara, to 8000 verses; and of 1000 *ὑπομνήματα*, or preludes, for the nomes of the flutes. **Timur** **Tipperary.**

Timotheus died in Macedonia, according to Suidas, at the age of 97; though the Marbles, much better authority, say at 90; and Stephen of Byzantium fixes his death in the fourth year of the 105th Olympiad, two years before the birth of Alexander the Great; whence it appears, that this Timotheus was not the famous player on the flute so much esteemed by that prince, who was animated to such a degree by his performance as to seize his arms; and who employed him, as Athenæus informs us, together with the other great musicians of his time, at his nuptials. However, by an inattention to dates, and by forgetting that of these two musicians of the same name the one was a Milesian and the other a Theban, they have been hitherto often confounded.

TIMUR-BECK. See **TAMERLANE**.

TIN, one of the four imperfect metals.

For an account of its metalline qualities, and the various states in which it is found, see **MINERALOGY**, page 118. For its chemical qualities, see the places referred to in **CHEMISTRY-Index**. For the method of assaying and smelting its ore, see **METALLURGY**, Part ii. sect. vi.; Part iii. sect. vi. See also **CORNWALL**, and **PHARMACY-Index**.—An advantageous commerce has been lately opened between Cornwall and the East Indies and China. In 1791 about 3000 tons of tin were raised in Cornwall; of which 2200 tons were sold in the European market for L. 72 each, and 800 tons carried to India and China at L. 62 per ton.

TINCAL, the name by which crude or impure borax is called. See **BORAX** and **CHEMISTRY-Index**.

TINCTURE, in pharmacy. See **PHARMACY-Index**.

TINDAL (Dr Matthew), a famous English writer, was the son of the reverend Mr John Tindal of Beer-Ferres in Devonshire, and was born about the year 1657. He studied at Lincoln college in Oxford, whence he removed to Exeter, and was afterwards elected fellow of All Souls. In 1685 he took the degree of doctor of law, and in the reign of James II. declared himself a Roman Catholic; but soon renounced that religion. After the revolution he published several pamphlets in favour of government, the liberty of the press, &c. His "Rights of the Christian Church asserted," occasioned his having a violent contest with the high-church clergy; and his treatise "Christianity as old as the Creation," published in 1730, made much noise, and was answered by several writers, particularly by Dr Conybeare, Mr Forster, and Dr Leland. Dr Tindal died at London in August 1733. He left in manuscript a second volume of his "Christianity as old as the Creation;" the preface to which has been published. Mr Pope has satirized Dr Tindal in his *Dunciad*.

TINDALE (William). See **TYNDALE**.

TINNING, the covering or lining any thing with melted tin, or tin reduced to a very fine leaf. Looking-glasses are foliated or tinned with thin plates of beaten tin, the whole bigness of the glass, applied or fastened thereto by means of quicksilver. See *FOLIATING of Looking Glasses*.

TINNING of Copper. See **COPPER**, n° 25—28.

TINNITUS AURIUM, a noise in the ears like the continued sound of bells, very common in many disorders, particularly in nervous fevers.

TIPPERARY, a county of the province of Munster in Ireland, bounded on the west by that of Limerick and Clare, on the east by the county of Kilkenny and Queen's County, on the south by the county of Waterford, and on the north and north-east by King's-county and the territory of the ancient O'Carols. It extends about 42 miles in length,

Tipstaff, length, 27 in breadth, containing 599,500 acres, divided into 12 baronies, in which are several market-towns and boroughs. It sends eight members to parliament, viz. two for the county, two for the city of Cashel, and two for each of the boroughs of Clonmell, Fetherd, and Thurles. The north part of it is mountainous and cold; but in the south the air is milder, and the soil much more fertile, producing plenty of corn, and good pasture for the numerous herds of cattle and flocks of sheep with which it abounds. The north part is called *Ormond*, and for a long time gave the title of *earl*, and afterwards of *marquis* and *duke*, to the noble family of Butler, descended from a sister of Thomas a Becket archbishop of Canterbury, till, at the accession of George I. the last duke was attainted of high-treason, and died abroad. In that part of the county, the family had great prerogatives and privileges granted them by Edward III. Another district in this county was anciently called the *County of the Holy Cross of Tipperary*, from a famous abbey in it styled *Holy Cross*, on account of a piece of Christ's cross that was said to be preserved there. This abbey and district enjoyed also special privileges in former times. The remains of the abbey, or rather the spot where it stood, are still held in great veneration, and much resorted to by the Roman Catholics.

TIPSTAFF, an officer who attends the judges with a kind of staff tipped with silver, and takes into his charge all prisoners who are committed or turned over at a judge's chambers.

TIPULA, the CRANE-FLY; a genus of insects belonging to the order of *diptera*. The mouth is a prolongation of the head; the upper-jaw is arched. They have two palpi, which are curved, and longer than the head. The proboscis is short, and bends inwards. Gmelin enumerates 123 species, of which 14 are British. They are divided into two families. 1. Those with wings displayed. 2. Those with wings incumbent, and which in form resemble a gnat.

This two-winged insect is often taken for the gnat, which it resembles, but has not its mischievous instinct, nor its murderous proboscis. The larger tipulæ go by the name of *sempstresses*, the small ones by that of *culiciform*; the latter, in fine summer evenings, flutter about the water-side in legions, through which a person may pass on his way unhurt. The shrill noise they make with their wings is not very discernible. Tipulæ, before they become inhabitants of the air, creep under the form of grubs. Those which turn to larger tipulæ dwell in holes of decayed willows, in the dampest places, where they change into chrysalids, and in that state have the faculty of breathing thro' two small curve horns; besides which they are endowed with progressive motion, but not retrogressive, being impeded by little spines placed on every ring of the abdomen. When the shroud is torn, the insect, prettily apparelled, escapes from his gloomy habitation by means of his wings, which often are variegated, and takes his pastime in the fields. Its long legs, and its wings, mutually assist each other when it either walks or flies. The larvæ and chrysalids of the little tipulæ are found in water. They are various in colour, form, and carriage; some being grey, others brown, and others red; some, like the polypus, furnished with a pair of arms; several with cylindrical tubes that perform the office of vent-holes. These swim with nimbleness; those never leave the holes they have dug for themselves in the banks of rivulets. Lastly, others make a silken cod that receives part of their body; but all of them, after a period, renounce their reptile and aquatic life, and receive wings from the hands of nature. Their frame is then so weak, that a touch is enough to crush them.

They are sometimes of a beautiful green, sometimes coal-black; and the most remarkable are those whose fore-legs, extraordinarily long, do not touch the ground, and are moveable like antennæ. In this state of perfection, the tipulæ being provided with proper organs, apply themselves to the propagation of the species. Those same poor insects, who in the state of larvæ have escaped the voraciousness of fishes, often become, in their progress through the air, a prey to equally merciless birds.

TIRE, in the sea-language, is a row of cannon placed along a ship's side, either above upon deck, or below, distinguished by the epithets of *upper* and *lower tires*.

TIROL, a county of Germany in the circle of Austria, under which may be included the territories belonging to the bishops of Brixen, Trent, and Chur, Teutonic Order, and the prince of Deitrichstein, the Austrian seigniories before the Arlberg, and the Austrian districts in Swabia. It is 150 miles in length, and 120 in breadth, and contains 28 large towns.

The face of the country is very mountainous. Of these mountains, some have their tops always buried in snow; others are covered with woods, abounding with a variety of game; and others are rich in metals, and marble of all colours. Of the lower, some yield plenty of corn, others wine, and woods of chefnut trees. The valleys are exceeding fertile also, and pleasant. In some places considerable quantities of flax are raised, in others there is a good breed of horses and horned cattle; and, among the mountains, abundance of chamois and wild goats. In this country are also found precious stones of several sorts; as granates, rubies, amethysts, emeralds, and a species of diamonds; agates, cornelians, chalcedonies, malachites, &c. nor is it without hot-baths, acid waters, salt-pits, mines of silver, copper, and lead, mineral colours, alum, and vitriol. The principal river of Tirol is the Inn, which, after traversing the country, and receiving a number of lesser streams into it, enters Bavaria, in which, at Passau, it falls into the Danube. The men here are very tall, robust, and vigorous; the women also are stout, and generally fair; and both sexes have a mixture of the Italian and German in their tempers and characters. As there is little trade or manufacture in the country, except what is occasioned by the mines and salt-works, many of the common people are obliged to seek a subsistence elsewhere. A particular kind of salutation is used all over Tirol. When a person comes into a house, he says, "Hail! Jesus Christ:" the answer is, "May Christ be praised, and the Holy Virgin his mother." Then the master of the house takes the visitor by the hand. This salutation is fixed up in print at all the doors, with an advertisement tacked to it, importing, that pope Clement XI. granted 100 days indulgence, and a plenary absolution, to those who should pronounce the salutation and answer, as often as they did it. The emperor has forts and citadels so advantageously situated on rocks and mountains all over the country, that they command all the valleys, avenues, and passes that lead into it. The inhabitants, however, to keep them in good humour, are more gently treated, and not so highly taxed as those of the other hereditary countries. As to the states, they are much the same in this country as in the other Austrian territories, except that the peasants here send deputies to the diets. Tirol came to the house of Austria in the year 1363, when Margaret, countess thereof, bequeathed it to her uncle the dukes of Austria. The arms of Tirol are an eagle gules, in a field argent. The counts of Trap are hereditary stewards; the lords of Glosz, chamberlains; the princes of Trautlon, marshals; the counts of Wolkenstein, masters of the horse and carvers; the house of Spaur, cup-bearers; the counts of Kungl, sewers and rangers;

Tire,
Tirol.

Tipstaff,
Tipula.
Gough's
Edition of
Camden's
Britannia.

Titan. rangers; the counts of Brandis, keepers of the jewels; the house of Welsperg, purveyors and staff-bearers; and the counts of Coalto, falconers. Besides the governor, here are three sovereign colleges, subordinate to the court at Vienna, which sit at Inspruck, and have their different departments. Towards the expences of the military establishment of this county, the proportion is 100,000 florins yearly; but no more than one regiment of foot is generally quartered in it.

Tirol is divided into six quarters, as they are called; namely, those of the Lower and Upper Innthal, Vintsgow, Etch, Eisack, and Pusterthal.

TITAN, in fabulous history, the son of Cœlus and Terra, and the eldest brother of Saturn, suffered the latter to enjoy the crown, on condition that he should bring up none of his male issue, by which means the crown would at length revert to him; but Jupiter being spared by the address of Rhea, Saturn's wife, Titan and his children were so enraged at seeing their hopes frustrated, that they took up arms to revenge the injury; and not only defeated Saturn, but kept him and his wife prisoners till he was delivered by Jupiter, who defeated the Titans; when from the blood of these Titans slain in the battle, proceeded serpents, scorpions, and all venomous reptiles. See **SATURN**.

Such is the account given by the poets of this family of Grecian and Roman gods. From the fragments of Sanchoniatho, however, and other ancient writers, many learned men have inferred that the Titans were an early race of ambitious heroes, who laid the foundation of that idolatry which quickly overspread the world, and that by assuming the names of the luminaries of heaven they contrived to get themselves every where adored as the *Dii majorum gentium*. That the word *Titan* signifies the sun, there can indeed be very little doubt. Every one knows that such was its signification in the Æolic dialect; and as it is evidently compounded of *Ti*, which, in some oriental tongues, signifies *bright* or *clear*, and *Tan*, which signifies a *country* or the *earth*, it may be safely concluded that *Titan* was the name of the sun before the word was imported into Greece. But the great question among antiquarians is, of what country was that race which, assuming to themselves the names of the heavenly bodies, introduced into the world that species of idolatry which is known by the appellation of *Hero-worship*?

M. Pezron, in a work published many years ago, and entitled *The Antiquities of Nations*, maintains that the Titans were a family of Sacæ or Scythians, who made their first appearance beyond Media and mount Imaus, in the upper regions of Asia; that they were the descendants of Gomer the son of Japheth and grandson of Noah; and that after conquering a great part of the world, upon entering Upper Phrygia, they quitted their ancient name of Gomerians or Cimmerians, and assumed that of Titans. All this, he says, happened before the birth of Abraham and the foundation of the Assyrian monarchy; and he makes Uranus, their second prince in the order of succession, to have conquered Thrace, Greece, the Island of Crete, and a great part of Europe. Uranus was succeeded by Saturn, and Saturn by Jupiter, who flourished, he says, 300 years before Moses, and divided his vast empire between himself, his brother Pluto, and his cousin-german Atlas, who was called *Telamon*. For the truth of this genealogy of the Titans M. Pezron appeals to the most approved Greek historians; but unluckily for his hypothesis these writers have not a single sentence by which it can be fairly supported. It supposes not only the great antiquity of the Scythians, but likewise their early progress in arts and sciences, contrary to what we have proved in other articles of this work. See **SCULPTURE**, n° 4 and 5. and **SCYTHIA**.

Others, taking the fragment of Sanchoniatho's Phenician history for their guide, have supposed the Titans to have been the descendants of Ham. Of this opinion was bishop Cumberland; and our learned friend Dr Doig, to whom we have been indebted for greater favours, indulged us with the perusal of a manuscript, in which, with erudition and ingenuity struggling for the pre-eminence, he traces that impious family from the profane son of Noah, and shows by what means they spread the idolatrous worship of themselves over the greater part of the ancient world. Cronus, of whose exploits some account has been given elsewhere (see **SANCHONIATHO**), he holds to be Ham; and tracing the progress of the family from Phœnicia to Cyprus, from Cyprus to Rhodes, thence to Crete, and from Crete to Samathrace, he finds reason to conclude that the branch called *Titans* or *Titanides* flourished about the era of Abraham, with whom, or with his son Isaac, he thinks the Cretan Jupiter must have been contemporary. As they proceeded from countries which were the original seat of civilization to others in which mankind had sunk into the grossest barbarism, it was easy for them to persuade the ignorant inhabitants that they derived the arts of civil life from their parent the sun, and in consequence of their relation to him to assume to themselves divine honours. To ask how they came to think of such gross impiety, is a question as foolish as it would be to ask how Ham their ancestor became so wicked as to entail the curse of God upon himself and his posterity. The origin of evil is involved in difficulties; but leaving all inquiries into it to be prosecuted by the metaphysician and moralist, it is surely more probable that the worship of dead men originated among the descendants of Ham than among those of Shem and Japheth; and that the fragment of Sanchoniatho, when giving an account of the origin of the Titans, the undoubted authors of that worship, is more deserving of credit than the fabulous and comparatively late writers of Greece and Rome.

TITHES, in ecclesiastical law, are defined to be the tenth-part of the increase, yearly arising and renewing from the profits of lands, the stock upon lands, and the personal industry of the inhabitants: the first species being usually called *predial*, as of corn, grass, hops, and wood; the second *mixed*, as of wool, milk, pigs, &c. consisting of natural products, but nurtured and preserved in part by the care of man; and of these the tenth must be paid in gross; the third *personal*, as of manual occupations, trades, fisheries, and the like; and of these only the tenth-part of the clear gains and profits is due.

We shall, in this article, consider, 1. The original of the right of tithes. 2. In whom that right at present subsists. 3. Who may be discharged, either totally or in part, from paying them.

1. As to their original, we will not put the title of the clergy to tithes upon any divine right; though such a right certainly commenced, and we believe as certainly ceased, with the Jewish theocracy. Yet an honourable and competent maintenance for the ministers of the gospel is undoubtedly *jure divino*, whatever the particular mode of that maintenance may be. For, besides the positive precepts of the New Testament, natural reason will tell us, that an order of men who are separated from the world, and excluded from other lucrative professions for the sake of the rest of mankind, have a right to be furnished with the necessaries, conveniences, and moderate enjoyments of life, at their expence; for whose benefit they forego the usual means of providing them. Accordingly all municipal laws have provided a liberal and decent maintenance for their national priests or clergy; ours, in particular, have established this of tithes, probably in imitation of the Jewish law: and perhaps,

Titan,
Tithes.

Blackf.
Comment.

Tithes. haps, considering the degenerate state of the world in general, it may be more beneficial to the English clergy to found their title on the law of the land, than upon any divine right whatsoever, unacknowledged and unsupported by temporal sanctions.

We cannot precisely ascertain the time when tithes were first introduced into this country. Possibly they were contemporary with the planting of Christianity among the Saxons by Augustin the monk, about the end of the sixth century. But the first mention of them which we have met with in any written English law, is a constitutional decree, made in a synod held A. D. 786, wherein the payment of tithes in general is strongly enjoined. This canon or decree, which at first bound not the laity, was effectually confirmed by two kingdoms of the heptarchy, in their parliamentary conventions of estates, respectively consisting of the kings of Mercia and Northumberland, the bishops, dukes, senators, and people. Which was a few years later than the time that Charlemagne established the payment of them in France, and made that famous division of them into four parts; one to maintain the edifice of the church, the second to support the poor, the third the bishop, and the fourth the parochial clergy.

The next authentic mention of them is in the *sædus Edwardi et Guthrumi*; or the laws agreed upon between king Guthrum the Dane, and Alfred and his son Edward the Elder, successive kings of England, about the year 900. This was a kind of treaty between those monarchs, which may be found at large in the Anglo-Saxon laws: wherein it was necessary, as Guthrum was a Pagan, to provide for the subsistence of the Christian clergy under his dominion; and accordingly, we find the payment of tithes not only enjoined, but a penalty added upon non-observance: which law is seconded by the laws of Athelstan, about the year 930. And this is as much as can certainly be traced out with regard to their legal original.

2. We are next to consider the persons to whom tithes are due. Upon their first introduction, though every man was obliged to pay tithes in general, yet he might give them to what priests he pleased; which were called *arbitrary consecrations of tithes*; or he might pay them into the hands of the bishop, who distributed among his diocesan clergy the revenues of the church, which were then in common. But when dioceses were divided into parishes, the tithes of each parish were allotted to its own particular minister; first by common consent or the appointments of lords of manors, and afterwards by the written law of the land.

Arbitrary consecrations of tithes took place again afterwards, and were in general use till the time of king John. This was probably owing to the intrigues of the regular clergy, or monks of the Benedictine and other orders, under archbishop Dunstan and his successors; who endeavoured to wean the people from paying their dues to the secular or parochial clergy (a much more valuable set of men than themselves), and were then in hopes to have drawn, by sanctimonious pretences to extraordinary purity of life, all ecclesiastical profits to the coffers of their own societies. And this will naturally enough account for the number and riches of the monasteries and religious houses which were founded in those days, and which were frequently endowed with tithes. For a layman, who was obliged to pay his tithes somewhere, might think it good policy to erect an abbey, and there pay them to his own monks, or grant them to some abbey already erected: since for this donation, which really cost the patron little or nothing, he might, according to the superstition of the times, have masses for ever sung for his soul. But in process of years, the income of the poor laborious parish-priests being scanda-

Tithes. lously reduced by these arbitrary consecrations of tithes, it was remedied by pope Innocent III. about the year 1200, in a decretal epistle sent to the archbishop of Canterbury, and dated from the palace of Lateran: which has occasioned Sir Henry Hobart and others to mistake it for a decree of the council of Lateran, held A. D. 1179, which only prohibited what was called the *infeodation of tithes*, or their being granted to mere laymen; whereas this letter of pope Innocent to the archbishop enjoined the payment of tithes to the parsons of the respective parishes where every man inhabited, agreeable to what was afterwards directed by the same pope in other countries. This epistle, says Sir Edward Coke, bound not the lay subjects of this realm; but being reasonable and just, it was allowed of, and so became *lex terra*. This put an effectual stop to all the arbitrary consecrations of tithes; except some footsteps which still continue in those portions of tithes which the parson of one parish hath, though rarely, a right to claim in another: for it is now universally held, that tithes are due, of common right, to the parson of the parish, unless there be a special exemption. This parson of the parish may be either the actual incumbent, or else the appropriator of the benefice; appropriations being a method of endowing monasteries, which seems to have been devised by the regular clergy, by way of substitution to arbitrary consecrations of tithes.

3. We observed that tithes are due of common right to the parson, unless by special exemption; let us therefore see, *thirdly*, who may be exempted from the payment of tithes, and how lands and their occupiers may be exempted or discharged from the payment of tithes, either in part or totally; first, by a real composition; or, secondly, by custom or prescription.

First, a real composition is when an agreement is made between the owner of the lands and the parson or vicar, with the consent of the ordinary and the patron, that such lands shall for the future be discharged from payment of tithes, by reason of some land or other real recompense given to the parson in lieu and satisfaction thereof. This was permitted by law, because it was supposed that the clergy would be no losers by such composition; since the consent of the ordinary, whose duty it is to take care of the church in general, and of the patron, whose interest it is to protect that particular church, were both made necessary to render the composition effectual: and hence have arisen all such compositions as exist at this day by force of the common law. But experience showing that even this caution was ineffectual, and the possessions of the church being by this and other means every day diminished, the disabling statute 13 Eliz. c. 10. was made; which prevents, among other spiritual persons, all parsons and vicars from making any conveyances of the estates of their churches, other than for three lives or 21 years. So that now, by virtue of this statute, no real composition made since the 13 Eliz. is good for any longer term than three lives or 21 years, though made by consent of the patron and ordinary: which has indeed effectually demolished this kind of traffic; such compositions being now rarely heard of, unless by authority of parliament.

Secondly, a discharge by custom or prescription, is where time out of mind such persons or such lands have been either partially or totally discharged from the payment of tithes. And this immemorial usage is binding upon all parties; as it is in its nature an evidence of universal consent and acquiescence, and with reason supposes a real composition to have been formerly made. This custom or prescription is either *de modo decimandi*, or *de non decimando*.

A *modus decimandi*, commonly called by the simple name

Tithes.

of a *modus* only, is where there is by custom a particular manner of tithing allowed, different from the general law of taking tithes in kind, which are the actual tenth-part of the annual increase. This is sometimes a pecuniary compensation, as twopence an acre for the tithe of land: sometimes it is a compensation in work and labour, as that the parson shall have only the twelfth cock of hay, and not the tenth, in consideration of the owner's making it for him: sometimes, in lieu of a large quantity of crude or imperfect tithe, the parson shall have a less quantity when arrived at greater maturity, as a couple of fowls in lieu of tithe-eggs, and the like. Any means, in short, whereby the general law of tithing is altered, and a new method of taking them is introduced, is called a *modus decimandi*, or special manner of tithing.

A prescription *de non decimando* is a claim to be entirely discharged of tithes, and to pay no compensation in lieu of them. Thus the king by his prerogative is discharged from all tithes. So a vicar shall pay no tithes to the rector, nor the rector to the vicar, for *ecclesia decimas non solvit ecclesie*. But these personal privileges (not arising from or being annexed to the land) are personally confined to both the king and the clergy; for their tenant or lessee shall pay tithes, though in their own occupation their lands are not generally tithable. And, generally speaking, it is an established rule, that in lay hands, *modus de non decimando non valet*. But spiritual persons or corporations, as monasteries, abbots, bishops, and the like, were always capable of having their lands totally discharged of tithes by various ways: as, 1. By real composition. 2. By the pope's bull of exemption. 3. By unity of possession; as when the rectory of a parish, and lands in the same parish, both belonged to a religious house, those lands were discharged of tithes by this unity of possession. 4. By prescription; having never been liable to tithes, by being always in spiritual hands. 5. By virtue of their order; as the Knights Templars, Cistercians, and others, whose lands were privileged by the pope with a discharge of tithes. Though, upon the dissolution of abbeyes by Henry VIII. most of these exemptions from tithes would have fallen with them, and the lands become tithable again, had they not been supported and upheld by the statute 31 Henry VIII. c. 13. which enacts, that all persons who should come to the possession of the lands of any abbey then dissolved, should hold them free and discharged of tithes, in as large and ample a manner as the abbeyes themselves formerly held them. And from this original have sprung all the lands which being in lay hands, do at present claim to be tithe-free: for if a man can show his lands to have been such abbey-lands, and also immemorially discharged of tithes by any of the means before-mentioned, this is now a good prescription *de non decimando*. But he must show both these requisites: for abbey-lands, without a special ground of discharge, are not discharged of course; neither will any prescription *de non decimando* avail in total discharge of tithes, unless it relates to such abbey-lands.

It is universally acknowledged that the payment of tithes in kind is a great discouragement to agriculture. They are inconvenient and vexatious to the husbandman, and operate as an impolitic tax upon industry. The clergyman, too, frequently finds them troublesome and precarious; his expences in collecting are a considerable drawback from their value, and his just rights are with difficulty secured: he is too often obliged to submit to imposition, or is embroiled with his parishioners in disputes and litigations, no less irksome to his feelings than prejudicial to his interest, and tending to prevent those good effects which his precepts should produce. It is therefore of the utmost importance

to parochial tranquillity, and even to religion, that some just and reasonable standard of composition could be fixed. Land has been proposed, but in the present state of the division of property this is impossible: and as money is continually changing in its value, it would also be a very improper standard, unless some plan could be formed by which the composition could be increased as the value of money diminishes. A plan of this kind has been published in the Transactions of the Society instituted at Bath, Vol. IV. which those who are interested in this subject may consult for farther information.

TITHING, (*Tithinga*, from the Sax. *Theothunga*, i. e. *Decuriam*), a number or company of ten men, with their families, knit together in a kind of society, and all bound to the king, for the peaceable behaviour of each other. Anciently no man was suffered to abide in England above forty days, unless he were enrolled in some tithing.—One of the principal inhabitants of the tithing was annually appointed to preside over the rest, being called the *tithing-man*, the head-borough, and in some countries the borsholder, or borough's ealder, being supposed the discreetest man in the borough, town, or tithing. The distribution of England into tithings and hundreds is owing to king Alfred. See BORSEHOLDER.

TITIANO VECELLI, or TITIAN, the most universal genius for painting of all the Lombard school, the best colourist of all the moderns, and the most eminent for histories, portraits, and landscapes, was born at Cadore, in the province of Friuli, in the state of Venice, in 1477, or in 1480 according to Vasari and Sandrart. His parents sent him at ten years of age to one of his uncles at Venice, who finding that he had an inclination to painting, put him to the school of Giovanni Bellino.

But as soon as Titian had seen the works of Giorgione, whose manner appeared to him abundantly more elegant, and less constrained than that of Bellino, he determined to quit the style to which he had so long been accustomed, and to pursue the other that recommended itself to him, by having more force, more relief, more nature, and more truth. Some authors affirm, that he placed himself as a disciple with Giorgione; yet others only say, that he cultivated an intimacy with him; but it is undoubtedly certain that he studied with that great master; that he learned his method of blending and uniting the colours; and practised his manner so effectually, that several of the paintings of Titian were taken for the performances of Giorgione; and then his success inspired that artist with an invincible jealousy of Titian, which broke off their connection for ever after.

The reputation of Titian rose continually; every new work contributed to extend his fame through all Europe; and he was considered as the principal ornament of the age in which he flourished. And yet, Sandrart observes, that amidst all his applause, and constant employment at Venice, his income and fortune were inconsiderable; and he was more remarkable for the extensiveness of his talents, than for the affluence of his circumstances. But when his merit was made known to the emperor Charles V. that monarch knew how to set a just value on his superior abilities; he enriched him by repeated bounties, allowed him a considerable pension, conferred on him the honour of knighthood, and what was still more, honoured him with his friendship. He painted the portrait of that benefactor several times; and it is recorded by Sandrart, that one day, while the emperor was sitting for his picture, a pencil happening to drop from the painter, he stooped, took it up, and returned it; obligingly answering to the modest apology of the artist

Tithing,
Titiano.Pilkington's
Dictionary
of Painters.

Titian. (who blushed at the condescension of so great a monarch), that the merit of a Titian was worthy of the attendance of an emperor.

The excellence of Titian was not so remarkably apparent in the historical compositions which he painted as in his portraits and landscapes, which seem to be superior to all competition; and even to this day, many of them preserve their original beauty, being as much the admiration of the present age as they have deservedly been of the ages past. — It is observed of Titian by most writers, that in the different periods of his life he had four different manners; one resembling his first instructor Bellino, which was somewhat stiff; another, in imitation of Giorgione, more bold, and full of force; his third manner was the result of experience, knowledge, and judgment, beautifully natural, and finished with exquisite care, which manner was peculiarly his own; and in those pictures which he painted between the years of approaching old age and his death may be noticed his fourth manner. His portraits were very differently finished in his early, and in his latter time, according to the testimony of Sandrart. At first he laboured his pictures highly, and gave them a polished beauty and lustre, so as to produce their effect full as well when they were examined closely as when viewed at a distance; but afterwards, he so managed his penciling, that their greatest force and beauty appeared at a more remote view, and they pleased less when they were beheld more nearly. So that many of those artists who studied to imitate him, being misled by appearances which they did not sufficiently consider, have imagined that Titian executed his work with readiness and a masterly rapidity; and concluded that they should imitate his manner most effectually by a freedom of hand and a bold pencil: Whereas in reality, Titian took abundance of pains to work up his pictures to so high a degree of perfection; and the freedom that appears in the handling was entirely effected by a skilful combination of labour and judgment.

It cannot be truly affirmed, that Titian equalled the great masters of the Roman school in design; but he always took care to dispose his figures in such attitudes as showed the most beautiful parts of the body. His taste in designing men was not generally so correct or elegant as it appeared in his boys and female figures; but his colouring had all the look of real flesh, his figures breathe. He was not so bold as Giorgione, but in tenderness and delicacy he proved himself much superior to him and all other artists. The expression of the passions was not his excellence, though even in that respect many of his figures merited the justest commendation; but he always gave his figures an air of ease and dignity. His landscapes are universally allowed to be unequalled, whether we consider the forms of his trees, the grand ideas of nature which appear in his scenery, or his distances which agreeably delude and delight the eye of every observer; and they are executed with a light, tender, and mellow pencil. He learned from nature the harmony of colours, and his tints seem astonishing, not only for their force, but their sweetness; and in that respect his colouring is accounted the standard of excellence to all professors of the art.

It would prove almost an endless task to enumerate the variety of works executed by this illustrious artist, at Rome, Venice, Bologna, and Florence, as well as those which are to be seen in other cities of Italy, in England, Spain, Germany, and France; but there are two, which are mentioned as being truly admirable. One is, a Last Supper, preserved in the Refectory at the Escorial in Spain, which is imimitably fine; the other is at Milan, representing Christ crowned with Thorns. The principal figure in the latter

has an attitude full of grace and dignity more than mortal, and the countenance shows a benevolence and humility, combined with dignity and pain, which no pencil but that of Titian could so feelingly have described. It is admirably coloured, and tenderly and delicately penciled; the heads are wonderfully beautiful, the composition excellent, and the whole has a charming effect by the *chiaro-scuro*.

He was of so happy a constitution, that he was never ill till the year 1576, when he died of the plague, at 99 years of age. His disciples were Paulo Veronese, Giacomo Tintoret, Giacomo de Porte Bassano, and his sons.

TITLARK, in ornithology. See **ALAUDA**.

TITLE, an appellation of dignity or rank given to princes and persons of distinction.

Titles were not so common among the ancient Greeks or Romans as they are in modern times. Till the reign of Constantine the title of *Illustrious* was never given except to those who were distinguished in arms or letters: But at length it became hereditary in the families of princes, and every son of a prince was illustrious. The title of *Highness* was formerly given only to kings. The kings of England before the reign of Henry VIII. were addressed by the title of *your Grace*. That monarch first assumed the title of *Highness*, and afterwards that of *Majesty*. The title of majesty was first given him by Francis I. in their interview in 1520. Charles V. was the first king of Spain who assumed the same title.

Princes, nobles, and clergy generally have one title derived from their territories and estates, and another derived from their rank or from some other remarkable circumstance. The Pope is called the *Bishop of Rome*, and has the title of *Holiness*. A cardinal has his name generally from some church, and is saluted by the name of *Eminent*, or *most Eminent*. An archbishop, besides being named from his diocese, is called *his Grace* and *most Reverend*: a bishop is also distinguished by the name of his diocese, and has the title of *his Lordship* and *right Reverend*. Inferior clergymen are denominated *Reverend*.

The titles of crowned heads derived from their dominions it is unnecessary to mention. It will be sufficient to mention those by which they are addressed. To an emperor is given the title of *Imperial Majesty*; to kings, that of *Majesty*; to the princes of Great Britain, *Royal Highness*; to those of Spain, *Infant*; to electors, *Electoral Highness*; to the grand duke of Tuscany, *Most Serene Highness*; to the other princes of Italy and Germany, *Highness*; to the Doge of Venice, *Most Serene Prince*; to the grand-master of Malta, *Eminence*; to nuncios and ambassadors of crowned heads, *Excellency*; to dukes, *Grace*; to marquises, earls, and barons, *Lordship*.

The emperor of China, among his titles, takes that of *Tien Su*, "Son of Heaven." The Orientals, it is observed, are exceedingly fond of titles: the simple governor of Schiras, for instance, after a pompous enumeration of qualities, lordships, &c. adds the titles of *Flower of Courtesy*, *Nutmeg of Consolation*, and *Rose of Delight*.

TITLE, in law, denotes any right which a person has to the possession of a thing, or an authentic instrument whereby he can prove his right. See the articles **RIGHT**, **PROPERTY**, &c.

TITLE to the Crown in the British Constitution. See **SUCCESSION**.

TITMOUSE, in ornithology. See **PARUS**.

TITULAR, denotes a person invested with a title, in virtue of which he holds an office or benefice, whether he perform the functions thereof or not.

TITUS VESPASIANUS, the Roman emperor, the son of Vespasian; of whom it is related, that not being able to re-

Titlark

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Titus.

Tiviot
||
Tobacco.

collect any remarkable good action he had done on a certain day, he exclaimed, "I have lost a day!" He might truly be called the *father of his people*; and though Rome laboured under various public calamities during his reign, such was his equitable and mild administration, that he constantly preserved his popularity. He was a great lover of learning, and composed several poems. He reigned but two years; and it is thought Domitian his brother poisoned him, A. D. 81, aged 41. See (*History of*) ROME.

TIVIOT HILLS. See CHEVIOT.

TIVOLI, the modern name of TIBUR.

TOAD, in zoology. See RANA.

TOAD-Fish. See LOPHIUS.

TOAD-Flax, in botany. See ANTIRRHINUM.

TOAD Stone, a genus of argillaceous earths examined by Dr Withering. He describes it as of a dark-brownish grey colour; its texture granular; neither effervescing with acids nor striking fire with steel. The cavities of it are filled with crystallized spar, and in a strong heat it is fusible *per*

Philosophical
Transactions for
1782.

se. An hundred parts of toad-stone contain from 56 to 63.5 of siliceous earth, near 15 of argillaceous earth, 7.5 of calcareous earth, and 16 of oxydated iron. Dr Kirwan observes, that the toad-stone is not much different from baltes, only that it is softer: it contains also a smaller proportion of iron, and a larger one of siliceous earth.

TOBACCO, in botany. See NICOTIANA and SNUFF.

Leake's
Practical
Essay on
the Diseases
of the Vis-
cera.

The Indians (says Dr Leake) poison their arrows with the oil of tobacco, which, infused into a fresh wound, occasions sickness and vomiting, or convulsions and death; with what safety therefore, setting aside propriety, the subtle powder of this plant, called *snuff*, may be applied to the tender, internal surface of the nose, it may be proper to inquire; for, if the oil of tobacco is a mortal poison when applied to the open vessels of a wound, surely this plant, when taken in substance as snuff, must in a certain degree be injurious. From the infinite number of nerves diffused over the mucous membrane of the nose, it is endowed with exquisite feeling; and, the better to preserve the sense of smelling, those nerves are continually lubricated with moisture.

By the almost caustic acrimony of snuff, this moisture is dried up, and those fine, delicate nerves, the organs of smelling, are rendered callous and insensible. To this self-evident bad effect may be added the *narcotic* or stupifying power of tobacco, by which not only the brain and nerves are injured, but also the eyes depending upon their influence, together with the sense of smelling; and, from the force with which snuff is usually drawn up the nose, its passage will be obstructed, and the voice lose its clearness and distinct articulation.

Besides those pernicious qualities, snuff often involuntarily descends into the stomach, creating nausea, loss of appetite, and vomiting; and by its narcotic power will diminish nervous influence and impair digestion; it discolours the skin contiguous to the nose, and will taint the sweetest breath with the rank odour of a tobacco cask. For this reason the ladies of fashion in France seldom take snuff till they are married; a very high compliment, no doubt, to their husbands. The only advantage of taking snuff is that of sneezing, which, in sluggish, phlegmatic habits, will give universal concussion to the body, and promote a more free circulation of the blood; but of this benefit, snuff-takers are deprived, from being familiar with its use.

We have been told, that tobacco, when chewed, is a preservative against hunger: but this is a vulgar error; for, in reality, it may more properly be said to destroy appetite by the profuse discharge of saliva, which has already been considered as a powerful, dissolving fluid, essential both to appetite and digestion. In smoking, the fumes of tobacco

induce a kind of pleasing insensibility not easily described. Its narcotic odour, thus administered, equally infatuates the ignorant savage and the intelligent philosopher; but, by the large expence of saliva thereby occasioned, it is productive of many disorders of the head and stomach, particularly the last.

TOBACCO-Pipe-Fish. See FISTULARIA.

TOBACCO-wine. See PHARMACY-Index.

TOBAGO, one of the Caribbee islands, ceded to Great Britain by the treaty of Paris in 1763, taken by the French in 1781, and retaken by the British in 1793. It lies in the latitude of 11 degrees 15 minutes north, and 59 degrees 40 minutes longitude west from London, about 40 leagues south-by-west from Barbadoes, 35 south-east from St Vincent, 20 south-east from Grenada, 12 north-east from the Spanish island of Trinidad, and between 30 and 40 north-east from the Spanish main. According to the latest accounts, it is somewhat more than 30 miles in length from north-east to south-west, between 8 and 9 in breadth, and from 23 to 25 leagues in circumference. The English visited this island very early, Sir Robert Dudley being there in the reign of queen Elizabeth. In that of Charles I. William earl of Pembroke procured a grant of this, with two other small islands; but died before he was able to carry into execution his design of settling them. In A. D. 1632 some merchants of Zealand sent over a small colony thither, and gave it the name of *New Walcheren*; but before they were able thoroughly to establish themselves, they were destroyed by the Indians assisted by the Spaniards. Ten years after, James Duke of Courland sent a colony thither, who settled themselves upon Great Courland bay, and made a considerable progress in planting. A. D. 1654, Messieurs Adrian and Cornelius Lamphius, two opulent merchants of Flushing, sent a considerable number of people thither, who settled on the other side of the island, and lived in amity with the Courlanders, until they learned that the king of Sweden had seized the person of their duke and dispossessed him of his dominions, when they attacked and forced his subjects to submit. The duke being afterwards restored, he obtained from Charles II. a grant of this island, dated the 17th of November 1664. In the second Dutch war the count d'Estrees, by order of his master, totally ruined it at the close of the year 1677; and from that time it continued waste till Britain took possession of it after the treaty of Paris. The climate, notwithstanding its vicinity to the line, is so tempered by the breezes from the sea, as to be very supportable even to Europeans; and hath the same advantages with that of Grenada, in having regular seasons, and also in being exempt from the hurricanes. There are throughout the island many rising grounds, though, except at the north-east extremity, there is no part of it that can be styled mountainous; and even there the country is far from being rugged or impassable. The soil, if we may credit either Dutch or French writers, is as fertile and luxuriant as any of the islands, and very finely diversified. Ground provisions of all sorts have been raised in great plenty, a vast variety of vegetables, excellent in their kind, some for food, some for physic. Almost every species of useful timber is to be found here, and some of an enormous size; amongst others, the true cinnamon and nutmeg tree, as the Dutch confess, and of which none could be better judges; whole groves of saffras, and of trees that bear the true gum copal, with other odoriferous plants that render the air wholesome and pleasant. It is as well watered as can be wished, by rivers that fall into the sea on both sides, many smaller streams, and fine fresh springs in almost every part of the island. The sea-coast is indented by 10 or 12 fair and spacious bays, and there are amongst these

Tobacco,
Tobago.

Tobolski
||
Todus.

one or two ports capable of receiving as large ships as ever visited those seas. There are wild hogs in great plenty, abundance of fowls of different kinds, and a vast variety of sea and river fish. At the north-east extremity lies Little Tobago, which is two miles long, and about half a mile broad, very capable of improvement.

TOBOLSKI, the capital of Siberia, is situated at the confluence of the rivers Tobol and Irtysh, in N. Lat. 58° 12', E. Long. 68° 18'. The city stands upon the ascent of a high hill, the lower part of which is inhabited by Mahometan Tartars, who carry on a considerable traffic upon the river Irtysh, and convey their merchandise quite across Great Tartary, as far as China. The river Irtysh is reckoned as rapid as the Danube; runs from the south, and empties itself into the Oby: the Tobol washes the other side of the town, and a little below it falls into the Irtysh. By means of these two rivers, there is a constant flow of merchandise into the city during the summer season. Tobolski is therefore a great mart for the commodities of Muscovy, Tartary, and other countries: and here is a great concourse of merchants. All sorts of provisions are plentiful and cheap. An hundred weight of rice is sold for 16 copees, equal to about eight pence Sterling; a sturgeon weighing 40 pounds, for half that money; an ox for two rix-dollars, and every other article in proportion: the adjacent country abounds with game in great variety. The supreme court of judicature for all Siberia is held in this city, which is also the seat of a metropolitan, sent hither from Moscow to exercise spiritual jurisdiction over the whole kingdom. Tobolski is well fortified, and defended by a strong garrison, under the command of the waiwode, who resides in the place, and takes charge of the fur tribute, which is here deposited in proper magazines. This governor enjoys a very extensive command, and can occasionally bring into the field 9000 men, besides a strong body of Tartars on horseback, to make head against the Kalmucks and Cossacks, in their repeated incursions. A sufficient number of Russians, called *Jemshoiks*, are kept in continual pay by the government, on the banks of the Irtysh, to supply travellers on the czar's account with men, boats, or carriages, to convey them as far as Surgut on the Oby, a voyage of 200 leagues by water. This is the common method of travelling in the summer; but in winter the journey by land is not half so long, being performed in sleds over the ice and snow, with which the country is covered. These sleds are moved by a pair of dogs, which will draw a load of 300 pounds with surprising expedition. They are hired at easy rates, and during one half of the year may be seen flying over the snow in great numbers. The city is supposed to contain 15,000 inhabitants. It is 800 miles east from Moscow, and 1000 from Petersburg.

TODDA PANNA. See CYCAS.

TODDY, a name given to the juice of the cocoa nut tree. See ARAK.—Toddy is also a name given to a mixture of spirits, water, and sugar.

TODDY-BIRD. See LOXIA, species 11.

TODUS, the TODY, in ornithology; a genus belonging to the order of *picæ*. The beak is slender, depressed, broad, and the base beset with bristles. The nostrils are small and oval. The toes are placed three before and one behind; the middle are greatly connected to the outer. There are 15 species according to Dr Latham.

"Birds of this genus (says that eminent ornithologist) inhabit the warmer parts of America. They vary considerably in their bills as to breadth, but all of them have a certain flatness, or depression, which is peculiar. They have great affinity to the flycatchers; and indeed, to speak the truth, the two genera run much into one another: however,

in one thing they differ materially; for in the TODY the outer and middle toes are much connected, whereas in the flycatcher genus they are divided to their origin."

TOGA, in Roman antiquity, a wide woollen gown or mantle, which seems to have been of a semicircular form, without sleeves; differing both in richness and largeness, according to the circumstances of the wearer, and used only upon occasion of appearing in public.

Every body knows that the toga was the distinguished mark of a Roman: hence, the *jus togæ*, or privilege of a Roman citizen; *i. e.* the right of wearing a Roman habit, and of taking, as they explain it, fire and water through the Roman empire.

TOKAY-WINE, derives its name from a town of Hungary, where it is produced. There are four sorts of wine made from the same grapes, distinguished at Tokay by the names of *essence*, *auspruch*, *maslach*, and the *common wine*. The essence is made by picking out the half-dried and shrivelled grapes, and putting them into a perforated vessel, where they remain as long as any juice runs off by the mere pressure of their own weight. This is put into small casks. The *auspruch* is made by pouring the expressed juice of the grapes from which the former had been picked on those that yielded the essence, and treading them with the feet. The liquor thus obtained stands for a day or two to ferment, and then is poured into small casks, which are kept in the air for about a month, and afterwards put into casks. The same process is again repeated by the addition of more juice to the grapes which have already undergone the two former pressures, and they are now wrung with the hands; and thus is had the *maslach*. The fourth kind is made by taking all the grapes together at first, and submitting them to the greatest pressure: this is chiefly prepared by the peasants. The essence is thick, and very sweet and luscious: it is chiefly used to mix with the other kinds. The *auspruch* is the wine commonly exported, and which is known in foreign countries by the name of *Tokay*.

The goodness of it is determined by the following rules. The colour should neither be reddish nor very pale, but a light silver: in trying it, the palate and tip of the tongue should be wetted without swallowing it, and if it manifest any acrimony to the tongue, it is not good; but the taste ought to be soft and mild: when poured out, it should form globules in the glass, and have an oily appearance: when genuine, the strongest is always of the best quality: when swallowed, it should have an earthy astringent taste in the mouth, which is called the taste of the root. All tokay wine has an aromatic taste, which distinguishes it from every other species of wine. It keeps to any age, and improves by time: but is never good till about three years old. It is the best way to transport it in casks; for when it is on the seas, it ferments three times every season, and thus refines itself. When in bottles, there must be an empty space left between the wine and the cork, otherwise it would burst the bottle. A little oil is put upon the surface, and a piece of bladder tied over the cork. The bottles are always laid on their sides in sand. *Philosophical Transactions*, vol. lxxiii. part ii. p. 292, &c.

TOKENS. See TRADESMEN'S-TOKENS.

TOISE, a French measure containing six of their feet, or a fathom.

TOLAND (John), a very famous writer, was born near Londonderry in Ireland, 1670, and educated in the Popish religion; but at 16 years of age embraced the principles of the Protestants. He studied three years at the university of Glasgow; was created master of arts in the university of Edinburgh; and afterwards completed his studies at Leyden, where he resided two years. He then went to Oxford, where,

Toga
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Toland.

Toledo. where, having the advantage of the public library, he collected materials upon various subjects, and composed some pieces; among which was, A Dissertation to prove the received history of the tragical death of Atilius Regulus, the Roman consul, to be a fable. He began likewise a work of greater consequence, in which he undertook to show that there are no mysteries in the Christian religion. He published it in 1696 at London, under the title of *Christianity not mysterious*. This book gave great offence, and was attacked by several writers. He afterward wrote in favour of the Hanoverian succession, and many other pieces. In 1707 he went into Germany, where he visited several courts; and in 1710 he was introduced to Prince Eugene, who gave him several marks of his generosity. Upon his return to England he was for some time supported by the liberality of the earl of Oxford lord-treasurer, and kept a country-house at Epfom; but soon losing his lordship's favour, he published several pamphlets against that minister's measures. In the four last years of his life he lived at Putney, but used to spend most part of the winter in London. Mr Toland died at London in 1722. He was a man of uncommon abilities, published a number of curious tracts, and was perhaps the most learned of all the infidel writers; but his private character was far from being an amiable one; for he was extremely vain, and wanted those social virtues which are the chief ornaments as well as duties of life. His posthumous works, two volumes octavo, were published in 1726, with an account of his life and writings, by Mr Des Mai-zeaux.

Bourgoanne's
Travels in
Spain,
vol. ii.

TOLEDO, an ancient and trading city of Spain in New Castile, of which it was formerly the capital. About two centuries ago it is said to have contained more than 200,000 inhabitants; but they are now diminished to 20,000, or at most to 30,000. It is advantageously seated on the river Tajo, which surrounds it on two sides; and on the land-side it has an ancient wall built by a Gothic king, and flanked with 100 towers. It is seated on a mountain, which renders the streets uneven, and which are narrow; but the houses are fine, and there are a great number of superb structures, besides 17 public squares, where the markets are kept. The finest buildings are the royal castle and the cathedral church; which last is the richest and most considerable in Spain. It is seated in the middle of the city, joining to a handsome street, with a fine square before it. Several of the gates are very large, and of bronze. There is also a superb steeple extremely high, from whence there is a very distant prospect. The Sagrario, or principal chapel, is a real treasury, in which are 15 large cabinets let into the wall, full of prodigious quantities of gold and silver vessels, and other works. There are two mitres of silver gilt, set all over with pearls and precious stones, with three collars of massy gold, enriched in like manner. There are two bracelets and an imperial crown of the Virgin Mary, consisting of large diamonds and other jewels. The weight of the gold in the crown is 15 pounds. The vessel which contains the consecrated wafer is of silver gilt, as high as a man, and so heavy, that it requires 30 men to carry it; within it is another of pure gold enriched with jewels. Here are 38 religious houses, most of which are worthy a traveller's notice, with many other sacred buildings, a great number of churches belonging to 27 parishes, and some hospitals. Without the town are the remains of an amphitheatre, and other antiquities.

Swinburne's
Travels in
Spain.

Toledo is an archbishop's see, and the seat of the primate of Spain. His revenue is said to be worth 400,000 ducats, but there are large deductions to be made from it. It pays 15,000 ducats to the monks of the Escorial, besides several other pensions. Toledo has also a university.

It was formerly celebrated for the exquisite temper of the sword blades made there. It is situated in east longitude 3. 15. in north latitude 39. 50. and is 37 miles south from Madrid.

TOLERATION, in matters of religion, is either civil or ecclesiastical. Civil toleration is an impunity and safety granted by the state to every sect that does not maintain doctrines inconsistent with the public peace: and ecclesiastical toleration is the allowance which the church grants to its members to differ in certain opinions, not reputed fundamental.

As the gods of Paganism were almost all local and tutelary, and as it was a maxim universally received that it was the duty of every man to worship, together with his own deities, the tutelary gods of the country in which he might chance to reside, there was no room for persecution in the Heathen world, on account of different sentiments in religion, or of the different rites with which the various deities were worshipped. Had the primitive Christians joined their fellow-citizens in the worship of Jupiter, Juno, and the rest of the rabble of Roman divinities, they would have been suffered to worship, without molestation, the Creator of the world and the Redeemer of mankind; for in that case the God of the Christians would have been looked upon as a Being of the same kind with the gods of the empire; and the great principle of intercommunity would have remained unviolated. But the true God had expressly prohibited both Jews and Christians from worshipping any other god besides Himself; and it was their refusal to break that precept of their religion which made their Heathen masters look upon them as Atheists, and persecute them as a people inimical to the state. Utility, and not truth, was the object for which the Heathen legislatures supported the national religion. They well knew that the stories told by their poets of their different divinities, of the rewards of Elysium, and of the punishments of Tartarus, were a collection of senseless fables; but they had nothing better to propose to the vulgar, and they were not such strangers to the human heart, as to suppose that mankind could live together in society without being influenced in their conduct by some religion.

Widely different from the genius of Paganism was the spirit of the Jewish dispensation. Truth, which is in fact always coincident with general utility, was the great object of the Mosaic law. The children of Israel were separated from the rest of the world, to preserve the knowledge, and worship of the true God, at a time when all the other nations on earth, forgetting the Lord that made them, were falling prostrate to stocks and stones, and worshipping devils and impure spirits. Such was the contagion of idolatry, and so strong the propensity of the Israelites to the customs and manners of the Egyptians, and other polytheistic nations around them, that the purpose of their separation could not have been served, had not Jehovah condescended to become not only their tutelary God, but even their supreme civil Magistrate (see THEOLOGY, n° 151.); so that under the Mosaic economy, idolatry was the crime of high treason, and as such justly punished by the laws of the state. Among the Jews, the church and state were not indeed different societies. They were so thoroughly incorporated, that what was a sin in the one was a crime in the other; and the forfeiture of ecclesiastical privileges was the forfeiture of the rights of citizens.

In many respects the Christian religion is directly opposite to the ritual law of Moses. It is calculated for all nations, and intended to be propagated among all. Instead of separating one people from another, one of its principal objects is to disseminate universal benevolence, and to inculcate

Toleration. cate upon the whole human race, that mutual love which naturally springs from the knowledge that all men are brethren. Its ultimate end being to train its votaries for heaven, it concerns itself no farther with the affairs of earth than to enforce by eternal sanctions the laws of morality; and the kingdom of its Founder not being of this world, it leaves every nation at liberty to fabricate its own municipal laws, so as best to serve its own interest in the various circumstances in which it may be placed; and denounces a curse upon all who pay not to those laws the fullest obedience, when they were not obviously inconsistent with the laws of piety and virtue, which are of prior obligation. The Christian church therefore must always remain a distinct society from the state; and tho', till the present age of hazardous innovations, it has been deemed expedient in every country, where the truth of the gospel is admitted, to give to the religion of Christ a legal establishment, and to confer immunities on its ministers, this measure has been adopted, not to secure the purity of the faith which appeals to the private judgment of each individual, but merely to preserve the peace of society, and to put a restraint upon those actions of which human laws cannot take cognizance. With religion, Christian governments have no farther concern than as it tends to promote the practice of virtue. The early Christians, however, not understanding the principle upon which penal laws were employed to preserve the purity of the Jewish religion; and, as our blessed Lord observed to two of his apostles, not knowing what spirit they were of—hastily concluded that they had a right to enforce the doctrines and worship of the New Testament, by the same means which had been used to preserve the Israelites steady to the doctrines and worship of the Old. Hence, though they had suffered the cruellest persecutions themselves (see **PERSECUTION**), they no sooner got the power of the state in their hands, than they persecuted the Pagans for their idolatry; and afterwards, when heresies arose in the church, persecuted one another for expressing in different phrases metaphysical propositions, of such a nature as no human mind can fully comprehend. The apostle had forewarned them that there must be heresies in the church, that they who are approved may be made manifest; but it did not occur to them that persecution for opinion is the worst of all heresies, as it violates at once truth and charity.

Hitherto these unhallowed means of bringing Christians to uniformity of faith and practice, had been only occasionally employed from their not accurately distinguishing between the spirit of the gospel and that of the law; but as soon as the bishops of Rome had brought the inhabitants of Europe to recognize their infallibility in explaining articles of faith, and deciding points of controversy, persecution became a regular and permanent instrument of ecclesiastical discipline. To doubt or to deny any doctrine to which these unerring instructors had given the sanction of their approbation, was held to be not only a resisting of the truth, but an act of rebellion against their sacred authority; and the secular power, of which, by various arts, they had acquired the absolute direction, was instantly employed to avenge both.

"Thus Europe had been accustomed, during many centuries, to see speculative opinions propagated or defended by force, the charity and mutual forbearance which Christianity recommends with so much warmth, were forgotten, the sacred rights of conscience and of private judgment were unheard of; and not only the idea of toleration, but even the word itself, in the sense now affixed to it, was unknown. A right to extirpate error by force, was universally allowed to be the prerogative of those who possessed the knowledge of truth;" and though the first reformers did not arro-

gate to themselves in direct terms that infallibility which **Toleration.** they had refused to the church of Rome, they were not less confident of the truth of their own doctrines, and required with equal ardour the princes of their party to check such as presumed to impugn or to oppose them. To this request too many of these princes lent a willing ear. It flattered at once their piety and their pride to be considered as possessing all the rights of Jewish princes; and Henry the VIII. of England, after labouring to make his divines declare that all authority ecclesiastical as well as civil flows from the crown, persecuted alternately the Papists and Protestants. Many of his successors, whose characters were much better than his, thought themselves duly authorized, in virtue of their acknowledged supremacy over all states and conditions of men, to enforce by means of penal laws a uniformity of faith and worship among their subjects; and it was not till the revolution that any sect in England seems to have fully understood, that all men have an unalienable right to worship God in the manner which to them may seem most suitable to his nature, and the relation in which they stand to him; or that it is impossible to produce uniformity of opinion by any other means than candid disquisition and sound reasoning. That the civil magistrate has a right to check the propagation of opinions which tend only to sap the foundations of virtue, and to disturb the peace of society, cannot, we think, be questioned; but that he has no right to restrain mankind from publicly professing any system of faith, which comprehends the being and providence of God, the great laws of morality, and a future state of rewards and punishments, is as evident as that it is the object of religion to fit mankind for heaven, and the whole duty of the magistrates to maintain peace, liberty, and property, upon earth. We have elsewhere observed (see **TEST**), that among a number of different sects of Christians, it is not the superior purity of the system of faith professed by one of them, that gives it a right to the immunities of an establishment in preference to all its rivals; but tho' the legislature is authorized, in certain circumstances, to make a less pure system the religion of the state, it would be the height of absurdity to suppose that any man, or body of men, can have authority to prevent a purer system from being acknowledged as the religion of individuals. For propagating opinions and pursuing practices which necessarily create civil disturbance, every man is answerable to the laws of his country; but for the soundness of his faith, and the purity of his worship, he is answerable to no tribunal but that which can search the heart.

When churches are established, and creeds drawn up as guides to the preaching of the national clergy, it is obvious that every clergyman who teaches any thing directly contrary to the doctrine of such creeds, violates the condition on which he holds his living, and may be justly deprived of that living, whether his obnoxious opinion be in itself true or false, important or unimportant; but his punishment should be extended no farther. To expel a Christian from private communion for teaching any doctrine which is neither injurious to the state nor contrary to the few simple articles which comprise the sum of the Christian faith, is the grossest tyranny; and the governors of that church which is guilty of it, usurp the prerogative of their blessed Lord, who commanded the apostles themselves not to be called masters in this sense; for one (says he) is your master (*ὁ υἱος τοῦ ἀνθρώπου*), even Christ. It is indeed a hardship to deprive a man of his living for conscientiously illustrating what he believes to be a truth of the gospel, only because his illustration may be different from that which had formerly been given by men fallible like himself; but if the establishment of human compilations of faith be necessary, this hardship cannot.

Toll
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Toluifera.

cannot be removed, but by making such compilations as simple as possible, and drawing them up in Scripture language. Such a reformation, could it be effected peaceably, would serve other good purposes; for while it would sufficiently guard the purity of the faith, it would withdraw that temptation which too many establishments throw in the way of men, to subscribe to the truth of what they do not really believe; and it would effectually banish from the Christian church every thing which can be called by the name of *persecution*. See *NONCONFORMISTS*.

TOLL, a tax or custom paid for liberty to vend goods in a market or fair, or for keeping roads in proper repair. The first appointment of a toll on highways of which we read, took place in 1346. See *ROAD*.

TOLOUSE. See *TOULOUSE*.

TOLU, a town of South America in Terra Firma, and in the government of Carthage; famous for the fine balsam of Tolu, brought into Europe from thence, and produced from a tree like a pine. It is seated on a bay of the North Sea, 60 miles south of Carthage. W. Long. 72. 55. N. Lat. 9. 40.

TOLUIFERA, the *BALSAM OR TOLU-TREE*; a genus of plants belonging to the class of *decandria*, and order of *monogynia*. There is only one species; the *balsamum*.

This tree grows to a considerable height; it sends off numerous large branches, and is covered with rough, thick, greyish bark: the leaves are elliptical or ovate, entire, pointed, alternate, of a light green colour, and stand upon short strong footstalks: the flowers are numerous, and produced in lateral racemi: the calyx is bell-shaped, divided at the brim into five teeth, which are nearly equal, but one is projected to a greater distance than the others: the petals are inserted into the receptacle, and are five in number, of which four are equal, linear, and a little longer than the calyx; the fifth is much the largest, inversely heart-shaped, and its unguis is of the length of the calyx: the 10 filaments are very short, and furnished with long antheræ: the germen is oblong: there is no style: the stigma is pointed: the fruit is a round berry.

It grows in Spanish America, in the province of Tolu, behind Carthage, whence we are supplied with the balsam, which is brought to us in little gourd-shells. This balsam is obtained by making incisions in the bark of the tree, and is collected into spoons, which are made of black wax, from which it is poured into proper vessels.

This balsam is of a reddish yellow colour, transparent, in consistence thick and tenacious: by age it grows so hard and brittle, that it may be rubbed into a powder between the finger and thumb. Its smell is extremely fragrant, somewhat resembling that of lemons; its taste is warm and sweetish, and on being chewed it adheres to the teeth. Thrown into the fire it immediately liquifies, takes flame, and disperses its agreeable odour. Though it does not dissolve in water, yet if boiled in it for two or three hours in a covered vessel, the water receives its odoriferous smell: water also suffers a similar impregnation from the balsam by distillation. With the assistance of mucilage it unites with water, so as to form a milky solution. It dissolves entirely in spirit of wine, and easily mixes with distilled oils, but less easily with those of the expressed kind. Distilled without addition, it produces not only an empyreumatic oil, of a pale dark colour, but sometimes a small portion of a saline matter, similar to that of the flowers of benzoin.

This balsam possesses the same general virtues with the balsam of Gilead, and that of Peru; it is, however, less heating and stimulating, and may therefore be employed with more safety. It has been chiefly used as a pectoral, and is said to be an efficacious corroborant in gleet and fe-

minal weaknesses. It is directed by the Pharmacopœia in the syrupus tolutanus, tinctura tolutana, and syrupus balsamicus. See *PHARMACY-Index*.

TOMATOES. See *SOLANUM*.

TOMB, includes both the grave or sepulchre wherein a defunct is interred, and the monument erected to preserve his memory. The word is formed from the Greek *τομῆς*, *tumulus*, "sepulchre;" or, according to Menage, from the Latin *tumba*, which signifies the same.

In many nations it has been customary to burn the bodies of the dead; and to collect the ashes with pious care into an urn, which was deposited in a tomb or sepulchre. See *BURNING*. Among many nations it has also been the practice to lay the dead body in a tomb, without consuming it, after having wrapped it up decently, and sometimes placing it in a coffin. See *COFFIN*.

The tombs of the Jews were generally hollow places hewn out of a rock. Abraham buried Sarah in a cave. Such was the place too in which the kings of Judah and Israel were interred; and such was the place in which the body of our Saviour was deposited by Joseph of Arimathea. But it is probable that the common people buried their dead in graves; for our Saviour compares the Pharisees to "graves which appear not, and the men that appear not are not aware of them." Over the tombs, perhaps only of people of distinction, a stone or monument was erected, to intimate to passengers that they were burying places, that they might not pollute themselves by touching them. With the same intention, as Lightfoot informs us, they whitened them every year on the 15th of February.

The Egyptians also buried their dead in caves, called *catacombs*. See *CATACOMB*. The pyramids, as some think, were also employed for the same purpose. Sometimes also, after embalming their dead, they placed them in niches in some magnificent apartment in their houses.

The Greeks and Romans burned their dead, and deposited their ashes in a tomb. The Greeks interred the ashes without the cities, by the sides of their highways. Sometimes indeed, by way of particular honour, they were buried in an elevated part of the town; and the Lacedæmonians were allowed by Lycurgus to bury in the city and round their temples: But this was forbidden among the Romans by the law of the twelve tables, *In urbe ne sepelito, ne-ve urito*; yet Valerius Publicola, Posthumus Tubertius, and the family of the Claudii, were buried in the Capitol. To bury by the sides of public roads was common among the Romans also; hence their epitaphs frequently began with *fiste viator*. Highways were made choice of probably for two reasons; 1. That the dead might not be offensive or injure the health of the living, which they certainly would if buried in towns or populous places; and, 2dly, That they might hold out to travellers a lesson of mortality, and teach the rustic moralist to die.

As it would swell this article to too great a size to describe all the different kinds of tombs which have been used by different nations and ages, we must content ourselves with shortly describing the tombs of a few nations, and adding a few concomitant circumstances.

The tombs of the Parsees are singular. The defunct, after lying a proper time in his own house, for the purposes of mourning, is carried, followed by his relations and friends, the females chanting a requiem, and deposited in a tomb of the following construction. It is a circular building, open at top, about 55 feet diameter, and 25 feet in height, filled to within 5 feet of the top, excepting a well of 15 feet diameter in the centre. The part so filled is terraced, with a slight declivity toward the well. Two circular grooves three inches deep are raised round the well; the first at the distance

Tomatoes
Tomb.

Woodville's
Medical
Botany.

Tomb. distance of four, the second at ten, feet from the well. Grooves of the like depth or height, and four feet distant from each other at the outer part of the outer circle, are carried straight from the wall to the well, communicating with the circular ones, for the purpose of carrying off the water, &c. The tomb, by this means, is divided into three circles of partitions: the outer, about seven feet by four; the middle, six by three; the inner, four by two: the outer for the men, the middle for the women, the inner for the children; in which the bodies are respectively placed, wrapped loosely in a piece of cloth, and left to be devoured by the vultures; which is very soon done, as numbers of those animals are always seen hovering and watching about these charnel houses, in expectation of their prey. The friends of the deceased, or the persons who have charge of the tomb, come at the proper time, and throw the bones into their receptacle, the well in the centre; for which purpose, iron rakes and tongs are deposited in the tomb. The entrance is closed by an iron door, four feet square, on the eastern side, as high up as the terrace, to which a road is raised. Upon the wall, above the door, an additional wall is raised, to prevent people from looking into the tomb, which the Parsees are particularly careful to prevent. A Persian inscription is on a stone inserted over the door, which we once copied, but have forgotten its tenor. From the bottom of the wall subterraneous passages lead to receive the bones, &c. and prevent the well from filling.

Archæologia, vol. vii. Of the ancient sepulchres found in Russia and Siberia, some are perfect tumuli, raised to an enormous height, while others are almost level with the ground. Some of them are encompassed with a square wall of large quarry stones placed in an erect position; others are covered only with a small heap of stones, or they are tumuli adorned with stones at top. Some are mured with brick within, and vaulted over; others are no more than pits or common graves. In some the earth is excavated several fathoms deep; others, and especially those which are topped by a lofty tumulus, are only dug of a sufficient depth for covering the carcase. In many of these sepulchres the bones of men, and frequently of horses, are found, and in a condition that renders it probable the bodies were not burnt before they were inhumed. Other bones show clearly that they have been previously burnt; because a part of them is unconsumed, and because they lie in a disordered manner, and some of them are wanting. Urns, in which other nations of antiquity have deposited the ashes of their dead, are never met with here. But sometimes what remained of the bodies after the combustion, and even whole carcases, are found wrapped up in thin plates of gold. Many dead bodies are frequently seen deposited together in one tomb; a certain indication that either a battle had been fought in the neighbourhood of the place, or that some families buried their relations in an hereditary tomb.

Chenier's Morocco, vol. i. The Moors, like all other Mahometans, hold it a thing irreverent, and contrary to the spirit of religion, to bury their dead in mosques, and to profane the temple of the Most High by the putrefaction of dead bodies. In the infancy of the church the Christians had the like piety, and gave example of the respect in which they held temples dedicated to religious worship; but ill-guided devotion, mingled with superstitious vanities, and that contagious spirit of self-interest which pervades all human affairs, without respecting the altar of God, have, together, insensibly perverted mens ideas. The burial grounds of the Mahometans are most of them without the city; the emperors have their sepulchres distinct and distant from the mosque, in sanctuaries, built by themselves, or in places which they have indicated: their tombs are exceedingly simple; the Moors do not imi-

tate the ostentation of Europeans, where superb monuments are raised rather to gratify the pride of the living than the merit of the dead.

All Mahometans inter the dead at the hour set apart for prayer. The defunct is not kept in the house, except he expires after sun-set; but the body is transported to the mosque, whither it is carried by those who are going to prayer. Each, from a spirit of devotion, is desirous to carry in his turn. The Moors sing at their burial service; which usage perhaps they have imitated after the Christians of Spain, for the oriental Mahometans do not sing. They have no particular colour appropriated to mourning; their grief for the loss of relations is a sensation of the heart they do not attempt to express by outward symbols. Women regularly go on the Friday to weep over and pray at the sepulchres of the dead, whose memory they hold dear.

Among the northern nations it was customary to bury their dead under heaps of stones called *cairns*, or under barrows: (See the articles *CAIRNS* and *BARROW*). The inhabitants of Tibet, it is said, neither bury nor burn their dead, but expose them on the tops of the mountains. See *TIBET*.

TOMPION, a sort of bung or cork used to stop the mouth of a cannon. At sea this is carefully encircled with tallow or putty, to prevent the penetration of the water into the bore, whereby the powder contained in the chamber might be damaged or rendered incapable of service.

TON, a measure or weight. See *TUN*.

tone, or *TUNE*, in music, a property of sound, whereby it comes under the relation of *grave* and *acute*; or the degree of elevation any sound has, from the degree of swiftness of the vibrations of the parts of the sonorous body.

The variety of tones in human voices arises partly from the dimensions of the windpipe, which, like a flute, the longer and narrower it is, the sharper the tone it gives; but principally from the head of the larynx or knot of the throat: the tone of the voice being more or less grave as the rima or cleft thereof is more or less open.

The word *tone* is taken in four different senses among the ancients: 1. For any sound; 2. For a certain interval, as when it is said the difference between the diapente and diatessaron is a tone; 3. For a certain locus or compass of the voice, in which sense they used the Dorian, Phrygian, Lydian tones; 4. For tension, as when they speak of an acute, grave, or a middle tone.

tone is more particularly used, in music, for a certain degree or interval of tune, whereby a sound may be either raised or lowered from one extreme of a concord to the other, so as still to produce true melody.

TONGUE. See *ANATOMY*, n° 102.

TONIC, in music, signifies a certain degree of tension, or the sound produced by a vocal string in a given degree of tension, or by any sonorous body when put in vibration.

Tonic, says Rousseau, is likewise the name given by Aristoxenus to one of the three kinds of chromatic music, whose divisions he explains, and which was the ordinary chromatic of the Greeks, proceeding by two semitones in succession, and afterwards a third minor.

Tonic Dominant. See *DOMINANT*.

TONNAGE and **POUNDAGE**, an ancient duty on wine and other goods, the origin of which seems to have been this: About the 21st of Edward III. complaint was made that merchants were robbed and murdered on the seas. The king thereupon, with the consent of the peers, levied a duty of 2 s. on every ton of wine, and 12 d. in the pound on all goods imported; which was treated as illegal by the commons. About 25 years after, the king, when the knights of shires were returned home, obtained a like grant from the citizens

Tompion
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Tonnage

Tonnage,
Tonquin.

Blackst.
Comment.
vol. I.

citizens and burgessees, and the year after it was regularly granted in parliament. These duties were diminished sometimes, and sometimes increased; at length they seem to have been fixed at 3s. tonnage and 1s. poundage. They were at first usually granted only for a stated term of years, as, for two years in 5 Ric. II.; but in Henry VI.'s time they were granted him for life by a statute in the 31st year of his reign; and again to Edward IV. for the term of his life also: since which time they were regularly granted to all his successors for life, sometimes at the first, sometimes at other subsequent parliaments, till the reign of Charles I.; when, as the noble historian expresses it, his ministers were not sufficiently solicitous for a renewal of this legal grant. And yet these imposts were imprudently and unconstitutionally levied and taken, without consent of parliament, for 15 years together; which was one of the causes of those unhappy discontents, justifiable at first in too many instances, but which degenerated at last into causeless rebellion and murder. For, as in every other, so in this particular case, the king (previous to the commencement of hostilities) gave the nation ample satisfaction for the errors of his former conduct, by passing an act, whereby he renounced all power in the crown of levying the duty of tonnage and poundage, without the express consent of parliament; and also all power of imposition upon any merchandises whatever. Upon the restoration this duty was granted to King Charles II. for life, and so it was to his two immediate successors; but now, by three several statutes, 9 Ann. c. 6. 1 Geo. I. c. 12. and 3 Geo. I. c. 7. it is made perpetual, and mortgaged for the debt of the public.

TONQUIN, a kingdom of Asia, in the East Indies, beyond the Ganges; bounded on the north by the province of Yunnan in China, on the east by the province of Canton and the bay of Tonquin, on the south by Cochin China, and on the west by the kingdom of Laos. It is about 1200 miles in length and 500 in breadth; and is one of the finest and most considerable kingdoms of the East, as well on account of the number of inhabitants as the riches it contains and the trade it carries on. The country is thick set with villages; and the natives in general are of a middle stature and clean limbed, with a tawny complexion. Their faces are oval and flattish, and their noses and lips well proportioned. Their hair is black, long, lank, and coarse; and they let it hang down their shoulders. They are generally dexterous, nimble, active, and ingenious in mechanic arts. They weave a multitude of fine silks, and make curious lacker-works, which are transported to other countries. There is such a number of people, that many want employment; for they seldom go to work but when foreign ships arrive. The money and goods brought hither by the English and Dutch put them in action; for they have not money of their own sufficient to employ themselves; and therefore one-third at least must be advanced beforehand by the merchants: and the ships must stay here till the goods are finished, which is generally five or six months. They are so addicted to gaming, that when every thing else is lost, they will stake their wives and children. The garments of the Tonquinese are made either of silk or cotton; but the poor people and soldiers wear only cotton of a dark tawny colour. Their houses are small and low; and the walls either of mud, or hurdles daubed over with clay. They have only a ground-floor, with two or three partitions; and each room has a square hole to let in the light. The villages consist of 30 or 40 houses, surrounded with trees; and in some places there are banks to keep the water from overflowing their gardens, where they have oranges, betels, melons, and salad-herbs. In the rainy season they cannot pass from one house to another without

wading through the water; they sometimes have boats. In the capital city called *Cacho* there are about 20,000 houses with mud-walls, and covered with thatch; a few are built with brick, and roofed with pan-tiles. In each yard is a small arched building like an oven, about six feet high, made of brick, which serves to secure their goods in case of fire. The principal streets are very wide, and paved with small stones. The king of Tonquin has three palaces in it, such as they are; and near them are stables for his horses and elephants. The house of the English factory is seated at the north end of the city, fronting the river, and is the best in the city. The people in general are courteous, and civil to strangers; but the great men are proud, haughty, and ambitious; the soldiers insolent, and the poor thievish. They buy all their wives, of which the great men have several; but the poor are stinted for want of money. In hard times the men will sell both their wives and children to buy rice to maintain themselves. The women offer themselves to strangers as wives while they stay, and agree with them for a certain price. Even the great men will offer their daughters to the merchants and officers who are likely to stay six months in the country. They are not afraid of being with child; for if they are girls they can sell them well when they are young, because they are fairer than the other inhabitants. These women are said to be very faithful; and are trusted with money and goods by the Europeans during their absence, and will make great advantage with them. The first new moon in the year that happens after the middle of January, is a great festival; when they rejoice for 10 or 12 days together, and spend their time in all manner of sports. Their common drink is tea, but they make themselves merry with arrack. The language is spoken very much in the throat; and some of the words are pronounced through the teeth, and has a great resemblance to the Chinese. They have several mechanic arts or trades; such as smiths, carpenters, joiners, turners, weavers, tailors, potters, painters, money-changers, paper-makers, workers in lacker, and bell-founders. Their commodities are gold, musk, silks, calicoes, drugs of many sorts, woods for dyeing, lacquered wares, earthen wares, salt, aniseeds, and worm-seeds. The lacquered ware is not inferior to that of Japan, which is accounted the best in the world. With all these merchandises, one would expect the people to be very rich, but they are in general very poor; the chief trade being carried on by the Chinese, English, and Dutch. The goods imported, besides silver, are saltpetre, sulphur, English broad-cloth, pepper, spices, and great guns.

TONSILS. See ANATOMY, n° 102.

TONSURE, in ecclesiastical history, a particular manner of shaving or clipping the hair of ecclesiastics or monks. The ancient tonsure of the clergy was nothing more than polling the head, and cutting the hair to a moderate degree, for the sake of decency and gravity: and the same observation is true with respect to the tonsure of the ancient monks. But the Romans have carried the affair of tonsure much farther; the candidate for it kneeling before the bishop, who cuts the hair in five different parts of the head, viz. before, behind, on each side, and on the crown.

TONTINE, a loan given for life annuities with benefit of survivorship; so called from the inventor Laurence Tonti, a Neapolitan. He proposed his scheme in 1653 to reconcile the people to cardinal Mazarine's government, by amusing them with the hope of becoming suddenly rich. He obtained the consent of the court, but the parliament would not register the edict. He made attempts afterwards, but without success.

It was not till Louis XIV. was distressed by the league of Augsburg, and by his own immense expences, that he

Tonquin
Tontine.

Tool
||
Topaz.

had recourse to the plans of Tenti, which, though long laid aside, were not forgotten. By an edict in 1689 he created a Tontine royale of 1,400,000 livres annual rent, divided into 14 classes. The actions were 300 livres apiece, and the proprietors were to receive 101. *per cent.* with benefit of survivorship in every class. This scheme was executed but very imperfectly; for none of the classes rose to above 25,000 livres, instead of 100,000, according to the original institution; though the annuities were very regularly paid. A few years after, the people seeming in better humour for projects of this kind, another tontine was erected upon nearly the same terms, but this was never above half full. They both subsisted in the year 1726, when the French king united the 13th class of the first tontine with the 14th of the second; all the actions of which were possessed by Charlotte Bonnemay, widow of Lewis Barbier, a surgeon of Paris, who died at the age of 96. This gentlewoman had ventured 300 livres in each tontine; and in the last year of her life she had for her annuity 73,500 livres, or about 3600*l.* a-year, for about 30*l.*

The nature of the tontine is this; there is an annuity, after a certain rate of interest, granted to a number of people; divided into classes, according to their respective ages; so that annually the whole fund of each class is divided among the survivors of that class; till at last it falls to one, and upon the extinction of that life, reverts to the power by which the tontine was erected, and which becomes thereby security for the due payment of the annuities.

TOOL, among mechanics, denotes in general any small instrument used as well for making other complex instruments and machines, as in most other operations in the mechanic arts.

TOOTH, for a description of, see ANATOMY, n° 27.

TOOTHACH. See MEDICINE, n° 210, SURGERY, n° 236, TEETH, and ELECTRICITY, p. 535.

TOOTHACH-Tree. See ZANTHOXYLUM.

TOOTHWORT. See PLUMBAGO.

TOP, a sort of platform, surrounding the lower mast-head, from which it projects on all sides like a scaffold.

The principal intention of the top is to extend the top-mast shrouds, so as to form a greater angle with the mast, and thereby give additional support to the latter. It is sustained by certain timbers fixed across the hounds or shouls of the mast, and called the *treble-trees* and *cross-trees*.

Besides the use above-mentioned, the top is otherwise extremely convenient to contain the materials necessary for extending the small sails, and for fixing or repairing the rigging and machinery with more facility and expedition. In ships of war it is used as a kind of redoubt, and is accordingly fortified for attack or defence; being furnished with swivels, musketry, and other fire-arms, and guarded by a thick fence of corded hammocks. Finally, it is employed as a place for looking out, either in the day or night.

Top-Mast, the second division of a mast, or that part which stands between the upper and lower pieces. See the article MAST.

Top-Sails, certain large sails extended across the top-masts by the top-sail-yard above, and by the yard attached to the lower mast beneath; being fastened to the former by robands, and to the latter by means of two great blocks fixed on its extremities, through which the top-sail-sheets are inserted, passing from thence to two other blocks fixed on the inner part of the yard close by the mast; and from the latter the sheets lead downwards to the deck, where they may be slackened or extended at pleasure. See the article SAIL.

TOPAZ, in natural history, a gem called by the ancients *chrysolite*, as being of a gold colour; its texture foliaceous; its

form cubic, parallelopipedal, or prismatic; its specific gravity from 3,46 to 4,56; it loses its colour only in a very strong heat, and of the usual fluxes it yields only to borax and microcosmic salt. According to Bergman, 100 parts of it contain 46 of argill, 39 of siliceous earth, 8 of mild calcareous, and 6 of iron. Its great specific gravity shews these earths to be very perfectly united.

The finest topazes in the world are found in the East Indies; but they are very rare there of any great size: the Great Mogul, however, at this time, possesses one which is said to weigh 157 carats, and to be worth more than 20,000 pounds. The topazes of Peru come next after these in beauty and in value. The European are principally found in Silesia and Bohemia, and are generally full of cracks and flaws, and of a brownish yellow.

TOPE, in ichthyology, a species of SQUALUS.

TOPHET. See HINNOM and MOLOCH.

TOPHUS, in medicine, denotes a chalky or stony concretion in any part of the body; as the bladder, kidney, &c. but especially in the joints.

TOPIC, a general head or subject of discourse.

TOPICS, in oratory. See ORATORY, n° 10—13.

TOPICS, or *Topical Medicines*, are the same with external ones, or those applied outwardly to some diseased and painful part: such are plasters, cataplasms, unguents, &c.

TOPOGRAPHY, a description or draught of some particular place, or small track of land, as that of a city or town, manor or tenement, field, garden, house, castle, or the like; such as surveyors set out in their plots, or make draughts of, for the information and satisfaction of the proprietors.

TOPSHAM, a town in Devonshire, in England, seated on the river Exmouth, five miles south-east of Exeter, to which place the river was formerly navigable; but in time of war was choaked up designedly, so that ships are now obliged to load and unload at Topsham. W. Long. 3. 26. N. Lat. 50. 39.

TORBAY, a fine bay of the English channel, on the coast of Devonshire, a little to the east of Dartmouth, formed by two capes, called *Bury Points*, and *Bob's Nose*.

TORDA, or RASOR-BILL. See ALCA, n° 4.

TORDYLIUM, HART-WORT, in botany: A genus of plants belonging to the class of *pentandria*, and order of *digynia*; and in the natural system arranged under the 45th order, *Umbellatæ*. The corollets are radiated, and all hermaphrodite; the fruit is roundish, and crenated on the margin; the involucre long and undivided. There are seven species; of which two are British, the *nodosum* and *officinale*.

1. The *nodosum*, or knotted parsley, has simple sessile umbels, the exterior seeds being rough. It grows in the borders of corn-fields, and in dry stony places. 2. The *officinale*, officinal hart-wort, has partial involucre, as long as the flowers; leaflets oval and jagged: the seeds are large and flat, and their edges notched.

TORIES, a political faction in Britain, opposed to the Whigs.

The name of *Tories* was given to a sort of banditti in Ireland, and was thence transferred to the adherents of Charles I. by his enemies, under the pretence that he favoured the rebels in Ireland. His partisans, to be even with the republicans, gave them the name of *Whigs*, from a word which signifies *whey*, in derision of their poor fare. The Tories, or *cavaliers*, as they were also called, had then principally in view the political interests of the king, the crown, and the church of England; and the round-heads, or Whigs, proposed chiefly the maintaining of the rights and interests of the people, and of Protestantism. This is the most popular account; and yet it is certain the names *Whig* and

Tore
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Tones.
Kirwan's
Mineralogy.

Tormentil- *Tory* were but little known till about the middle of the reign of king Charles II. M. de Cize relates, that it was in the year 1678 that the whole nation was first observed to be divided into Whigs and Tories; and that on occasion of the famous deposition of Titus Oates, who accused the Catholics of having conspired against the king and the state, the appellation of *Whig* was given to such as believed the plot real; and *Tory* to those who held it fictitious.

These parties may be considered either with regard to the state or to religion. The state Tories are either violent or moderate: the first would have the king to be absolute, and therefore plead for passive obedience, non-resistance, and the hereditary right of the house of Stuart. The moderate Tories would not suffer the king to lose any of his prerogative; but then they would not sacrifice those of the people. The state Whigs are either strong republicans or moderate ones. "The first (says Rapin) are the remains of the party of the long parliament, who attempted to change monarchy to a commonwealth: but these make so slender a figure, that they only serve to strengthen the party of other Whigs. The Tories would persuade the world, that all the Whigs are of this kind; as the Whigs would make us believe that all the Tories are violent. The moderate state Whigs are much in the same sentiments with the moderate Tories, and desire that the government may be maintained on the ancient foundation: all the difference is, that the first bear a little more to the parliament and people, and the latter to that of the king. In short, the old Whigs were always jealous of the encroachments of the royal prerogative, and watchful over the preservation of the liberties and properties of the people.

TORMENTILLA, TORMENTIL, in botany: A genus of plants belonging to the class of *icosandria*, and order of *polygynia*; and in the natural system ranging under the 35th order, *Senticosæ*. The calyx is octofid; the petals are four; the seeds round, naked, and affixed to a juiceless receptacle. There are two species; the *erecta* and *repens*, both indigenous.

1. The *erecta*, common tormentil, or septfoil, has a stalk somewhat erect, and sessile leaves. The roots consist of thick tubercles, an inch or more in diameter, replete with a red juice of an astringent quality. They are used in most of the Western Isles, and in the Orkneys, for tanning of leather; in which intention they are proved by some late experiments to be superior even to the oak-bark. They are first of all boiled in water, and the leather is afterwards steeped in the liquor. In the islands of Tirey and Col the inhabitants have destroyed so much ground by digging them up, that they have lately been prohibited the use of them. A decoction of these roots in milk is also frequently administered by the inhabitants of the same islands in diarrhoeas and dysenteries, with good success; but perhaps it would be most proper not to give it in dysenteries till the morbid matter be first evacuated. A spirituous extract of the plant stands recommended in the sea-scurvy, to strengthen the gums and fasten the teeth. Linnæus informs us, that the Laplanders paint their leather of a red colour with the juice of the roots.

2. The *repens*, or creeping tormentil, has reddish stalks, slender and creeping. The leaves are sharply serrated, grow on short footstalks, and are five-lobed. The flowers are numerous and yellow, blossom in July, and are frequent in woods and barren pastures.

TORNADO, a sudden and vehement gust of wind from all points of the compass, frequent on the coast of Guinea.

TORPEDO, the CRAMP-FISH. See RAJA, and ELECTRICITY, n° 258—261.

TORPOR, a numbness, or defect of feeling and motion.

Galen says it is a sort of intermediate disorder between palsy and health.

TORREFACTION, in chemistry, is the roasting or scorching of a body by the fire, in order to discharge a part either unnecessary or hurtful in another operation. Sulphur is thus discharged from an ore before it can be wrought to advantage.

TORRENT, denotes a temporary stream of water falling suddenly from mountains, whereon there have been great rains, or an extraordinary thaw of snow.

TORRICELLI (Evangeliste), an illustrious Italian mathematician and philosopher, born at Faenza in 1608. He was trained in Latin literature by his uncle a monk; and after cultivating mathematical knowledge for some time without a master, he studied it under father Benedict Castelli, professor of mathematics at Rome. Having read Galileo's dialogues, he composed a treatise on motion, on his principles, which brought him acquainted with Galileo, who took him home as an assistant: but Galileo died in three months after. He became professor of mathematics at Florence, and greatly improved the art of making telescopes and microscopes: but he is best known for finding out a method of ascertaining the weight of the atmosphere by quicksilver; the barometer being called, from him, the *Torricellian tube*. He published *Opera Geometrica*, 4to, 1644; and died in 1647.

TORRICELLIAN EXPERIMENT, a famous experiment made by Torricelli, by which he demonstrated the pressure of the atmosphere in opposition to the doctrines of suction, &c. finding that pressure able to support only a certain length of mercury, or any other fluid, in an inverted glass tube. See BAROMETER.

TORSK, or TUSK, in ichthyology. See GADUS.

TORTOISE, in zoology. See TESTUDO.

TORTOISE-SHELL, the shell, or rather scales, of the testaceous animal called a *tortoise*; used in inlaying, and in various other works, as for snuff-boxes, combs, &c. Mr Catesby *Phil. Trans.* observes, that the hard strong covering which incloses all sorts of tortoises, is very improperly called a *shell*; being of a perfect bony contexture; but covered on the outside with scales, or rather plates, of a horny substance; which are what the workmen call *tortoise-shell*.

There are two general kinds of tortoises, viz. the *land* and *sea-tortoise*, *testudo terrestris* and *marina*. The sea-tortoise, again, is of several kinds; but it is the caret, or *testudo imbricata* of Linnæus, alone which furnishes that beautiful shell so much admired in Europe.

The shell of the caretta, or hawkbill tortoise, is thick; and consists of two parts, the upper, which covers the back, and the lower the belly: the two are joined together at the sides by strong ligaments, which yet allow of a little motion. In the fore-part is an aperture for the head and fore-legs, and behind for the hind-legs and tail. It is the under shell alone that is used: to separate it, they make a little fire beneath it, and as soon as ever it is warm, the under shell becomes easily separable with the point of a knife, and is taken off in laminæ or leaves.

The whole spoils of the caret consist in 13 leaves or scales, eight of them flat, and five a little bent. Of the flat ones, there are four large ones, sometimes a foot long, and seven inches broad. The best tortoise shell is thick, clear, transparent, of the colour of antimony, sprinkled with brown and white. When used in marquetry, &c. the workmen give it what colour they please by means of coloured leaves, which they put underneath it.

Working and joining of TORTOISE shell.—Tortoise shell and horn become soft in a moderate heat, as that of boiling water, so as to be pressed, in a mould, into any form, the shell or horn

Torrefac-
tion
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Tortoise.

Phil. Trans.
n° 438, p.

117.

Torture
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Touch.

Touch
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Toulon.

horn being previously cut into plates of a proper size. Plummer informs us, in his *Art de Tourner*, that two plates are likewise united into one by heating and pressing them; the edges being thoroughly cleaned, and made to fit close to one another. The tortoise-shell is conveniently heated for this purpose by applying a hot iron above and beneath the juncture, with the interposition of a wet cloth to prevent the shell from being scorched by the irons: these irons should be pretty thick, that they may not lose their heat before the union is effected. Both tortoise-shell and horns may be stained of a variety of colours, by means of the colouring drugs commonly used in dyeing, and by certain metallic solutions.

TORTURE, a violent pain inflicted on persons to force them to confess the crimes laid to their charge, or as a punishment for crimes committed.

Torture was never permitted among the Romans except in the examination of slaves: it would therefore appear, that it was a general opinion among them, that a slave had such a tendency to falsehood, that the truth could only be extorted from him. To the disgrace of the professors of Christianity, torture was long practised by those who called themselves Catholics, against those whom they termed *heretics*; that is, those who differed in opinion from themselves. Finding that they could not bring over others to adopt their sentiments by the force of argument, they judge it proper to compel them by the force of punishment. This practice was very general among orthodox Christians, but especially among Roman Catholics. See **INQUISITION**.

By the law of England, torture was at one period employed to compel those criminals who stood obstinately mute when brought to trial, and refused either to plead guilty or not guilty; but it is now abolished (see **ARRAIGNMENT**, **RACK**). A history of the machines which have been invented to torture men, and an account of the instances in which these have been employed, would exhibit a dismal picture of the human character.

TORUS, in architecture, a large round moulding used in the bases of columns. See Plate XXXVIII. fig. 3.

TOUCAN, in ichthyology. See **RHAMPHASTOS**.

TOUCH-NEEDLE, among assayers, refiners, &c. little bars of gold, silver, and copper, combined together, in all the different proportions and degrees of mixture; the use of which is to discover the degree of purity of any piece of gold or silver, by comparing the mark it leaves on the touchstone with those of the bars.

The metals usually tried by the touchstone are gold, silver, and copper, either pure, or mixed with one another in different degrees and proportions, by fusion. In order to find out the purity or quantity of baser metal in these various admixtures, when they are to be examined they are compared with these needles, which are mixed in a known proportion, and prepared for this use. The metals of these needles, both pure and mixed, are all made into laminæ or plates, one-twelfth of an inch broad, and of a fourth part of their breadth in thickness, and an inch and half long; these being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the admixture in it. The black rough marbles, the basaltes, or the softer kinds of black pebbles, are the most proper for touchstones.

The method of using the needles and stone is this: The piece of metal to be tried ought first to be wiped well with a clean towel or piece of soft leather, that you may the better see its true colour; for from this alone an experienced person will, in some degree, judge beforehand what the principal metal is, and how and with what debased.

Then choose a convenient, not over large, part of the sur-

face of the metal, and rub it several times very hardly and strongly against the touchstone, that in case a deceitful coat or crust should have been laid upon it, it may be worn off by that friction: this, however, is more readily done by a grindstone or small file. Then wipe a flat and very clean part of the touchstone, and rub against it, over and over, the just mentioned part of the surface of the piece of metal, till you have, on the flat surface of the stone, a thin metallic crust, an inch long, and about an eighth of an inch broad: this done, look out the needle that seems most like to the metal under trial, wipe the lower part of this needle very clean, and then rub it against the touchstone, as you did the metal, by the side of the other line, and in a direction parallel to it.

When this is done, if you find no difference between the colours of the two marks made by your needle and the metal under trial, you may with great probability pronounce that metal and your needle to be of the same alloy, which is immediately known by the mark engraved on your needle. But if you find a difference between the colour of the mark given by the metal, and that by the needle you have tried, choose out another needle, either of a darker or lighter colour than the former, as the difference of the tinge on the touchstone directs; and by one or more trials of this kind you will be able to determine which of your needles the metal answers, and thence what alloy it is of, by the mark of the needle; or else you will find that the alloy is extraordinary, and not to be determined by the comparison of your needles.

TOUCH-STONE, a black, smooth, glossy stone, used to examine the purity of metals. The ancients called it *lapis Lydius*, the Lydian stone, from the name of the country whence it was originally brought.

Any piece of pebble or black flint will answer the purposes of the best lapis lydius of Asia. Even a piece of glass made rough with emery is used with success, to distinguish true gold from such as is counterfeit; both by the metallic colour and the test of aquafortis. The true touchstone is of a black colour, and is met with in several parts of Sweden. See **TRAPP**.

TOUCHWOOD. See **BOLETUS**.

TOULON, a celebrated city and seaport of France, in that part of the late province of Provence which is now denominated the department of the *Var*. It is a very ancient place, having been founded, according to the common opinion, by a Roman general. It is the chief town of the department, and before the great revolution in 1789 was an episcopal see. The inhabitants are computed at 80,000. It is divided into the Old Quarter and the New Quarter. The first, which is very ill built, has nothing remarkable in it but the *Rue aux Arbres*, the Tree Street, which is a kind of courie or mall, and the town-house; the gate of this is surrounded by a balcony, which is supported by two termini, the masterpieces of the famous Pujet. The New Quarter, which forms as it were a second city, contains, beside the magnificent works constructed in the reign of Louis XIV. many fine houses (among which that of the late seminary merits beyond comparison the preference) and a grand oblong square, lined with trees, and serving as a parade.

The Merchants Haven, along which extends a noble quay, on which stands the townhouse, is protected by two moles, begun by Henry IV. The New Haven was constructed by Louis XIV. as were the fortifications of the city. In the front of this haven is an arsenal, containing all the places necessary for the construction and fitting out of vessels: the first object that appears is a rope-walk, entirely arched, extending as far as the eye can reach, and built af-

ter

Toulon,
Toulouse.

ter the designs of Vauban : here cables are made, and above is a place for the preparation of hemp. Here likewise is the armoury for muskets, pistols, halberds, &c. In the park of artillery are cannons placed in piles, bombs, grenades, mortars, and balls of various kinds, ranged in wonderful order. The long sail room, the foundry for cannon, the dock-yards, the basons, &c. are all worthy of observation.

Both the old and New Port have an outlet into the spacious outer road or harbour, which is surrounded by hills, and formed by nature almost circular. Its circuit is of very great extent, and the entrance is defended on both sides by a fort with strong batteries. In a word, the basons, docks, and arsenal, at Toulon, warranted the remark of a foreigner that visited them in the late reign, that "the king of France was greater there than at Versailles." Toulon is the only mart in the Mediterranean for the re-exportation of the products of the East Indies.

This place was destroyed toward the end of the tenth century, and pillaged by the African pirates almost as soon as rebuilt. The constable of Bourbon, at the head of the Imperial troops, obtained possession of it in 1524, as did Charles V. in 1536; but in the next century Charles Emanuel duke of Savoy could not enter it, and Prince Eugene in 1707 ineffectually laid siege to it. This city was surrendered by the inhabitants in September 1793 to the British admiral Lord Hood, as a condition and means of enabling them to effect the re-establishment of monarchy in France, according to the constitution of 1789. Lord Hood accordingly, in conjunction with the Spanish land and naval forces, took possession of the harbour and forts in trust for Louis XVII. It was garrisoned for some time by the British troops, and their allies the Spaniards, Neapolitans, and Sardinians; but the French having laid siege to it, the garrison was obliged to evacuate the place in the month of December following, after having destroyed the grand arsenal, two ships of 84 guns, eight of 74, and two frigates; and carried off the Commerce de Marseilles, a ship of 120 guns, with an 80 and 74 gun ship. This exploit was most gallantly performed, after it was found impossible to defend the town, or to carry off the ships. Lord Hood entrusted the management of the affair to Sir Sydney Smith, so distinguished for his intrepidity. Captain Hare commanded the fireship which was towed into the grand arsenal; and so eager was he to execute his orders, that instead of setting fire to the train in the usual cautious manner, he fired a pistol loaded with powder into the bowl of the train, composed of 36 pounds of powder, and other combustibles. The consequence was, he was blown into the water with such violence, as to knock a lieutenant of the Victory's boat overboard, and narrowly escaped with his life. A Spanish captain was appointed to set fire to the small arsenal, but cowardice prevented him from executing his orders; and this is the reason why the whole French ships were not destroyed. We have been favoured with this account by an officer of the British fleet.

Toulon is seated on a bay of the Mediterranean, 17 leagues south-east of Aix, 15 south-east of Marseilles, and 217 south-east of Paris. E. Long. 5. 37. N. Lat. 43. 7.

TOULOUSE, a very ancient city of France, in the department of Upper Garonne, and late province of Languedoc, with an archbishop's see. It is the most considerable city in France next to Paris and Lyons, although its population bears no proportion to its extent. According to Mr Neckar's calculation, it contains 56,000 inhabitants. The streets are very handsome, and the walls of the city, as well as the houses, are built with bricks. The townhouse, a modern structure, forms a perfect square, 324 feet long and

66 high. The principal front occupies an entire side of the grand square, lately called the *Place Royale*. In the great hall, called the *Hall of Illustrious Men*, is the statue of the Chevalier Isaure, and the busts of all the great men to whom Toulouse has given birth. Communicating with the ocean on one side by the river Garonne, and with the Mediterranean on the other by the canal of Languedoc, Toulouse might have been a very commercial city; but the taste of the inhabitants has been principally for the sciences and belles-lettres. Of course, there are two colleges, two public libraries, and three academies. The little commerce of Toulouse consists in leather, drapery, blankets, mignonets, oil, iron, mercery, hardware, and books. The bridge over the Garonne is at least equal to those of Tours and Orleans; it forms the communication between the suburb of St Cyprian and the city. The quays extend along the banks of the Garonne; and it has been in contemplation to line them with new and uniform houses. Toulouse is 37 miles east of Auch, 125 south-east of Bourdeaux, and 350 south-by-west of Paris. E. Long. 1. 27. N. Lat. 43. 36.

TOUP (the Reverend Jonathan), was descended from a family formerly settled in Dorsetshire. His grandfather, Onesiphorus Toup, had been a man of good property, and patron as well as incumbent of Bridport, in that county; but he appears to have been embarrassed in his circumstances before his death, as he parted with the advowson, and left a numerous family very slenderly provided for. His second son Jonathan was bred to the church, and was curate and lecturer of St Ives in Cornwall. He married Prudence, daughter of John Busvargus, Esq; of Busvargus in Cornwall, and by her had issue Jonathan, the subject of this article, and one daughter.

Mr Toup lost his father while he was a child; and his mother some time after marrying Mr Keigwyn, vicar of Landrake in Cornwall, his uncle Busvargus (the last male of that family) took him under his care, and considered him as his own child. He bore the whole charge of his education both at school and at college, and procured for him the rectory of St Martin's near Looe.

Mr Toup was born at St Ives in Cornwall in the year 1713. He received the first rudiments of his education in a grammar school in that town; and was afterwards placed under the care of Mr Gurney, master of a private school in the parish of St Merryn. Thence he was removed to Exeter College in Oxford, where he took his degree of Bachelor of Arts. His master's degree he took at Cambridge in the year 1756. He obtained the rectory of St Martin's in 1750; was installed prebendary of Exeter in 1774; and instituted to the vicarage of St Merryn in 1776: the two last preferments he owed to the patronage of Bishop Kettel of Exeter. By the death of his uncle Busvargus without issue in 1751, Mrs Keigwyn (sister to Mr Busvargus, and mother to Mr Toup) succeeded as heir at law to his estate and effects. She died in 1773, and left a will bequeathing the whole of her estates to her son Mr Jonathan Toup.

In the year 1760 Mr Toup published the first part of his *Emendationes in Suidam*, and in 1764 the second part of the same work. These books procured him the notice of Bishop Warburton, who from the time of their publication honoured him with his correspondence and patronage. The Bishop, in one of his letters, laments his having a see without any preferment on it; "had it been otherwise, he should have been too selfish to invite any of his brethren to share with him in the honour of properly distinguishing such merit as Mr Toup's. All, however, that the Bishop could do, he did with the warmth and earnestness of sincere friendship. He repeatedly recommended Mr Toup to Archbishop Secker,

Toup.

Toup. Secker, to the Trustees for disposing of his Options, to Lord Shelburne, and to Bishop Keppel; and the favours this prelate bestowed on Mr Toup were owing to the solicitations of Bishop Warburton. The third part of the *E-mendationes in Suidam* was published in 1766. In the following year Archbishop Secker expressed a desire that Mr Toup would lend his assistance towards a new edition of Polybius, which was then in contemplation. Bishop Warburton strongly pressed his compliance with this wish, and that he would lay by for a while the Notes he was preparing for Mr Warton's edition of Theocritus. In the year 1767 Mr Toup's *Epistola Critica ad virum celeberrimum Gul. Episcop. Gloc.* made its appearance. In the year 1770, Mr Warton's edition of Theocritus was printed at the university press in Oxford. Mr Toup was a large contributor towards the corrections and annotations of this edition. A note of his on Idyll. xiv. 37. gave such offence to some persons, that the vice-chancellor of Oxford prevailed on the editor to cancel the leaf on which it was printed, and substitute another in its room. In 1772 Mr Toup published his *Appendiculum Notarum in Theocritum*, in which the substance (A) of the cancelled note was inserted. He concludes his preface to this work with these words: "*Quod vero scripsimus ad xiv. 37. verum est et honestum. Sed rem pro singulari sua sagacitate minus ceperunt nonnulli Oxonienses; qui et me fugillare haud erubuerunt; homunculi eruditione mediocri, ingenio nullo; qui in Hebraicis per omnem fere vitam turpiter volutati, in literis elegantioribus plane hospites sunt.*" Mr Toup's next work was the *Appendiculum Notarum in Suidam*, published in 1775. In 1778 his *Longinus* was published from the Oxford press in quarto. A second edition has since been printed in octavo.

As a writer of great learning, and of singular critical sagacity, Mr Toup needs no encomiast. The testimonies of Mr T. Warton, of Bishop Warburton, and of every person in any way distinguished for classical learning at home; of Ernestus, Hemsterhusius, Runkhenius, Valckenær, Brunck, Kluit, D'Anse de Villosion, L'Archer, &c. &c. in all parts of Europe, sufficiently establish his reputation as an author. To most or all of these he was assisting in the several works they published.

As his whole life was past in literary retirement, his character as a man was known but to few. It will appear from his works that he was not wholly untinctured with that self-complacency which is the almost inseparable companion of too much solitude; and by those who best knew him, he is said to have been unhappy in his disposition. His virtues, however, were respectable, and his learning was confessedly great. His theological studies were well directed: he sought for the truths of religion where only they can be found, in the Scriptures; not in the glosses and comments of men: it will be needless to add, that he was a liberal and a tolerant divine. He was punctual and serious in the discharge of the duties of his profession; and in his preaching singularly plain and forcible. He died on the 19th of January 1785, just entering into the 72d year of his age, and was buried under the communion-table in his church of St Martin's.

Mr Toup was a Christian from conviction; not merely from the accident of having been born in a country where Christianity was professed. He fulfilled the duties of life conscientiously, and from principle, without parade or ostentation. In his pursuit of learning he was actuated by the most honourable motives; by the desire of improving his own mind, and of amusing himself and others. If in Bishop

Warburton he found a patron, capable of distinguishing merit, and zealous to reward it, let it be remembered, to the honour of both parties, that the Bishop's patronage was offered, not solicited. In the year 1764 he was repeatedly pressed by another prelate to quit his retirement at St Martin's, and to settle either in London or in Oxford, where he might have access to books, and might place himself in the way of notice and preferment. He was assured, at the same time, that the bishop of his diocese would himself make a tender of his connivance at his non-residence, without any application from Mr Toup on the subject. But every proposal of this nature he constantly rejected; for he considered the non-residence of the parochial clergy as a neglect of duty, for which no apology can be made. He was never married, and rather capriciously left his fortune, amounting, it has been said, to L. 12,000, to a niece whose mother was his half-sister, taking not the least notice in his will of his other nephews and nieces, whose mother was his full sister.

TOUR (Henry de la), viscount Turenne, a celebrated French general, was the second son of Henry de la Tour duke of Bouillon, and was born at Sedan in 1611. He made his first campaigns in Holland, under Maurice and Frederic Henry princes of Orange; who were his uncles by the mother's side; and even then distinguished himself by his bravery. In 1634 he marched with his regiment into Lorraine; and having contributed to the taking of La Mothe, was, though very young, made marechal de camp. In 1636 he took Saverne, and the year following the castles of Hirson and Sole; on which occasion he performed an action like that of Scipio's, with respect to a very beautiful woman whom he sent back to her husband. The viscount Turenne continued to distinguish himself in several sieges and battles, and in 1644 was made marshal of France; but had the misfortune to be defeated at the battle of Mariendal in 1645. However, he gained the battle of Nortlingen three months after; restored the elector of Treves to his dominions; and the following year made the famous junction of the French army with that of Sweden commanded by general Wrangel, which obliged the duke of Bavaria to demand a peace. Afterwards that duke breaking the treaty he had concluded with France, he was defeated by the viscount Turenne at the battle of Zumarhausen, and in 1648 driven entirely out of his dominions. During the civil wars in France he sided with the princes, and was defeated at the battle of Rhetel in 1650; but soon after was restored to the favour of the king, who in 1652 gave him the command of his army. He acquired great honour at the battles of Jergau, Gren, and the suburbs of St Anthony, and by the retreat he made before the army commanded by the princes at Ville Neuve St George. In 1654 he made the Spaniards raise the siege of Arras: the next year he took Conde, St Guilian, and several other places; gained the famous battle of Dunes; and made himself master of Dunkirk, Oudenarde, and almost all Flanders: this obliged the Spaniards to conclude the peace of the Pyrenees in 1660. These important services occasioned his being made marshal-general of the king's camps and armies. The war being renewed with Spain in 1667, Turenne commanded in Flanders; and took so many places, that in 1668 the Spaniards were obliged to sue for peace. He commanded the French army in the war against the Dutch in 1672; took 40 towns in 22 days; pursued the elector of Brandenburg even to Berlin; gained the battles of Slintsheim, Ladenburg, Ennheim, Mulhausen, and Turkeim; and obliged the Imperial army, which

Tour.

(A) Not improbably all of that note which was omitted in the substituted leaf.

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which consisted of 70,000 men, to repass the Rhine. By this campaign the viscount Turenne acquired immortal honour. He passed the Rhine to give battle to general Montecuculi, whom he followed as far as Sasbach; but mounting upon an eminence to discover the enemy's camp, he was killed by a cannon-ball in 1675. All France regretted the loss of this great man, who by his military exploits had raised the admiration of Europe.

TOURAINÉ, a province of France, bounded on the north by Maine, on the east by Orleanois, on the south by Berris, and on the west by Anjou and Poitou. It is about 58 miles in length, and 55 in breadth where it is broadest. This country is watered by 17 rivers, besides many brooks, which not only render it delightful, but keep up a communication with the neighbouring provinces. The air is temperate, and the soil is so fruitful that it is called the *garden of France*. It now forms the department of Indre and Loire, of which Tours is the capital.

TOURMALINE, in mineralogy, a species of siliceous earth.

It has been found only in Ceylon, Brazil, and Tyrol. That of Ceylon is of a dark brown or yellowish colour; its specific gravity 3,065, or 3,295; that of Brazil is green, blue, red, or yellow, and its specific gravity 3,075 or 3,180; that of Tyrol by reflected light is of a blackish brown, but by refracted light yellowish, or in thin pieces green; its specific gravity 3,050; mostly crystallized in polygon prisms, but sometimes amorphous. The thickest parts are opaque: the thin more or less transparent.

The proportion of their constituent parts has been found by Bergman,

	<i>Tourmaline</i> of Tyrol.	of Ceylon.	of Brazil.
Argill,	42	39	50
Silex,	40	37	34
Calcareous earth,	12	15	11
Iron,	6	9	5
	100	100	100

For the electrical qualities of tourmaline, see ELECTRICITY, n^o 54.

TOURNAMENT, a martial sport or exercise which the ancient cavaliers used to perform, to show their bravery and address. It is derived from the French word *tourner*, i. e. "to turn round," because to be expert in these exercises, much agility both of horse and man was requisite, they riding round a ring in imitation of the ancient Circi.

The first tournaments were only courses on horseback, wherein the cavaliers tilted at each other with canes in manner of lances; and were distinguished from jousts, which were courses or careers, accompanied with attacks and combats, with blunted lances and swords. See JUST.

The prince who published the tournament, used to send a king at arms, with a safe-conduct, and a sword, to all the princes, knights, &c. signifying that he intended a tournament and a clashing of swords, in the presence of ladies and damsels; which was the usual formula of invitation.

The first engaged man against man, then troop against troop; and after the combat, the judges allotted the prize to the best cavalier, and the best striker of swords; who was accordingly conducted in pomp to the lady of the tournament; where, after thanking her very reverently, he saluted her and likewise her two attendants.

These tournaments made the principal diversion of the 13th and 14th centuries. Munster says, it was Henry the Fowler, duke of Saxony, and afterwards emperor, who died

in 936, that first introduced them; but it appears from the chronicle of Tours, that the true inventor of this famous sport, at least in France, was one Geoffry, lord of Preuilli, about the year 1066.

Instances of them occur among the English in the reign of king Stephen, about the year 1140; but they were not much in use till Richard's time, towards the year 1149. After which period these diversions were performed with extraordinary magnificence in the Tilt-yard near St James's, Smithfield, and other places.

The following account of a tournament, from Maitland, is curious. King Richard II. designing to hold a tournament at London on the Sunday after Michaelmas, sent divers heralds to make proclamations of it in all the principal courts of Europe; and accordingly not a few princes, and great numbers of the prime nobility, resorted hither from France, Germany, the Netherlands, &c. This solemnity began on Sunday afternoon, from the Tower of London, with a pompous cavalcade of 60 ladies, each leading an armed knight by a silver chain, being attended by their 'squires of honour, and, passing through Cheapside, rode to Smithfield, where the jousts and tournaments continued several days with magnificent variety of entertainments; on which occasion the king kept open house at the bishop of London's palace for all persons of distinction, and every night concluded with a ball.

At last, however, they were found to be productive of bad effects, and the occasions of several fatal misfortunes—as in the instance of Henry II. of France, and of the tilt exhibited at Chalons, which, from the numbers killed on both sides, was called the *little war of Chalons*. These and other inconveniences, resulting from those dangerous pastimes, gave the popes occasion to forbid them, and the princes of Europe gradually concurred in discouraging and suppressing them.

TOURNAY, a town of the Austrian Netherlands in Flanders, and capital of a district called *Tournaysis*, with a bishop's see. It is divided into two parts by the river Scheld; and is large, populous, well built, and carries on a great trade in woollen stuffs and stockings. The cathedral is a very handsome structure, and contains a great many chapels, with rich ornaments, and several magnificent tombs of marble and brass. The town was taken by the allies in 1709; but was ceded to the house of Austria by the treaty of Utrecht, though the Dutch had a right to put in a garrison. It was taken by the French in June 1745, who demolished the fortifications. In 1781 the emperor Joseph II. obliged the Dutch to withdraw their garrison. It was taken by the French in 1791, abandoned by them in 1793, and again conquered by them in 1794. It is 14 miles south-east of Lille, 30 south-west of Ghent, and 135 north by east from Paris. E. Long. 3. 28. N. Lat. 50. 33.

TOURNEFORT (Joseph Pitton de), a famous French botanist, born at Aix in Provence in 1656. He had a passion for plants from his childhood, which overcame his father's views in putting him to study philosophy and divinity; therefore on his death he quitted theology, and gave himself up entirely to physic, natural history, and botany. He wandered over the mountains of Dauphiny, Savoy, Catalonia, the Pyrenees, and the Alps, in search of new species of plants, which he acquired with much fatigue and danger. His fame in 1683 procured him the employment of botanic professor, in the king's garden; and by the king's order, he travelled into Spain, Portugal, Holland, and England, where he made prodigious collections of plants. In 1700, Mr Tournefort, in obedience to another order, sailed over all the isles of the Archipelago, upon the coasts of the Black Sea, in Bithynia, Pontus, Cappadocia, Armenia,

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nia, and Georgia; making observations on natural history at large, ancient and modern geography, religion, manners, and commerce. He spent three years in this learned voyage; and then resuming his profession, was made professor of physic in the college-royal. He died in consequence of an accidental crush of his breast by a cart-wheel, which brought on a spitting of blood and hydrothorax, that carried him off in 1708. He wrote *Elements of Botany*, both in French and Latin; *A Relation of his Voyage into the Levant*; with other pieces of less consideration.

TOURNIQUET, in surgery, an instrument formed with screws, for compressing any part with rollers, &c. for the stopping of hæmorrhagies. See **SURGERY**, n° 160.

TOWER, a tall building consisting of several stories, usually of a round form, though some are square or polygonal. Towers are built for fortresses, &c. as the Tower of London. See **LONDON**, n° 46.

TOWN, a place inhabited by a considerable number of people, being of a middle size between a city and a village.

TOXICODENDRON, in botany. See **RHUS**.

TRAAS. See **TERRAS**.

TRACHEA. See **ANATOMY**, n° 116.

TRACHINUS, the *WEEVER*, a genus of fishes belonging to the order of jugulares. There is but one species, viz. the *draco*, or common weever. The qualities of this fish were well known to the ancients, who take notice of them without any exaggeration: the wounds inflicted by its spines are exceedingly painful, attended with a violent burning and most pungent shooting, and sometimes with an inflammation that will extend from the arm to the shoulder.

It is a common notion, that these symptoms proceed from something more than the small wound this fish is capable of inflicting; and that there is a venom infused at least into the wounds made by the spines that form the first dorsal fin, which is dyed with black, and has a most suspicious aspect; though it is possible, that the malignity of the symptoms arises from the habit of body the person is in, or the part in which the wound is given. The remedy used by some fishermen is the sea-sand, with which they rub the place affected for a considerable time. At Scarborough, stale urine warmed is used with success. In the Universal Museum for November 1765, is an instance of a person who was reduced to great danger by a wound from this fish, and who was cured by the application of sweet oil, and taking opium and Venice treacle.

This fish buries itself in the sands, leaving only its nose out, and if trod on immediately strikes with great force; and they have been seen directing their blows with as much judgment as fighting cocks. Notwithstanding this noxious property of the spines, it is exceeding good meat.

The English name seems to have no meaning, being corrupted from the French *la vive*, so called as being capable of living long out of the water, according to the interpretation of Belon. It grows to the length of 12 inches, but is commonly found much less: the irides are yellow: the under jaw is longer than the upper, and slopes very much towards the belly; the teeth are small: the back is straight, the sides are flat, the belly is prominent, the lateral line straight: the covers of the gills are armed with a very strong spine: the first dorsal fin consists of five very strong spines, which, as well as the intervening membranes, are tinged with black; this fin, when quiescent, is lodged in a small hollow: the second consists of several soft rays, commences just at the end of the first, and continues almost to the tail: the pectoral fins are broad and angular; the ventral fins small: the vent is placed remarkably forward, very near the throat: the anal fin extends to a small distance from the

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tail, is a little hollowed in the middle, but not so much as to be called forked: the sides are marked lengthwise with two or three dirty yellow lines, and transversely by numbers of small ones: the belly silvery.

TRACT, in geography, an extent of ground, or a portion of the earth's surface.

TRACT, in matters of literature, denotes a small treatise or written discourse upon any subject.

TRADE, in general, denotes the same with commerce, consisting in buying, selling, and exchanging of commodities, bills, money, &c. See **COMMERCE**, **COIN**, **MONEY**, **COMPANY**, &c.

TRADE-WINDS, denote certain regular winds at sea, blowing either constantly the same way, or alternately this way and that; thus called from their use in navigation, and the Indian commerce. See **WIND**.

TRADESMEN'S TOKENS, a term synonymous among medallists with provincial coins.

This is a subject curious enough to deserve attention, though we will not go so far as Mr Pinkerton does, who says that it is a subject in which the perpetual glory of the nation is interested. Since the year 1789 provincial halfpence have been made and circulated in considerable quantity. As ancient medals and coins have been frequently of use to historians, it is to be regretted that many of these provincial halfpence are rendered useless in this respect by unmeaning figures and puerile devices. Utility and elegance ought to be studied: for this view it has been proposed by a gentleman of taste on this subject, that all coins should be distinguished by one of the following five characteristics. 1. Fac similes of magnificent beautiful buildings. 2. Representations of great and useful undertakings. 3. Emblems of the industry and commerce of the age. 4. The illustrious men, &c. to which the nation has given birth. 5. Important historical events.

For these hints we acknowledge ourselves indebted to the papers of an ingenious gentleman published in the periodical works of the time. Those who wish to see more upon the subject, may consult the *Universal Magazine* for August 1796.

TRADITION, something handed down from one generation to another without being written. Thus the Jews pretended, that besides their written law contained in the Old Testament, Moses had delivered an oral law which had been conveyed down from father to son; and thus the Roman Catholics are said to value particular doctrines supposed to have descended from the apostolic times by tradition.

TRAGACANTH. See **ASTRAGALUS**, **PHARMACY-Index**.

TRAGEDY, a dramatic poem, representing some signal action performed by illustrious persons, and which has frequently a fatal issue or end. See **POETRY**, Part II. sect. 1.

TRAGI-COMEDY, a dramatic piece, partaking both of the nature of tragedy and comedy; in which a mixture of merry and serious events is admitted.

TRAGOPOGON, **GOAT'S BEARD**, in botany: A genus of plants belonging to the class of *syngenesia*, and to the order of *polygamia equalis*; and in the natural system ranging under the 49th order, *Compositæ*. The receptacle is naked, the calyx simple, and the pappus plumose. There are 14 species; of which two are British, the *pratense* and *porrifolium*.

1. The *pratense*, or yellow goat's beard, has its calyxes equal with the florets, and its leaves entire, long, narrow, sessile, and grassy. In fair weather this plant opens at sunrise, and shuts between nine and ten in the morning. The

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roots are conical and esculent, and are sometimes boiled and served up at table like asparagus. It grows on meadows. 2. The *porrifolium*, or purple goat's beard, has the calyx longer than the radius of the floret; the flowers are large, purple, single, and terminal; and the leaves long, pointed, and bluish. The root is long, thick, and esculent. It grows in meadows, and is cultivated in gardens under the name of *salsafy*.

TRAJAN (Marcus Ulpian), a celebrated Roman emperor, who gained many victories over the Parthians and Germans, pushing the empire to its utmost extent on the east and north sides. He died at Silinunte, a city of Cilicia, which from him was called *Trajanopolis*, in the year 117.

TRAJAN'S Column, a famous historical column erected in Rome, in honour of the emperor Trajan. It is of the Tuscan order, though somewhat irregular: its height is eight diameters, and its pedestal Corinthian: it was built in a large square called *Forum Romanum*. Its base consists of 12 stones of an enormous size, and is raised on a socle, or foot, of eight steps: within is a staircase illuminated with 44 windows. It is 140 feet high, which is 35 feet short of the Antonine column, but the workmanship of the former is much more valued. It is adorned from top to bottom with basso relievos, representing the great actions of the emperor against the Dacians.

TRAIN, a line of gunpowder laid to give fire to a quantity thereof, in order to do execution by blowing up earth, works, buildings, &c.

TRAIN of Artillery, includes the great guns and other pieces of ordnance belonging to an army in the field.

TRAIN-Oil, the oil procured from the blubber of a whale by boiling.

TRALLIAN (Alexander), a Greek writer on physic, a native of Tralles in Lydia, who lived about the middle of the sixth century. His works are divided into 12 books; in which he treats of distempers as they occur, from head to foot. He was the first who opened the jugular vein, and that used cantharides as a blister for the gout. Dr Freind, in his History of Physic, styles him one of the most valuable authors since the time of Hippocrates. Though he appears on the whole to have been a rational physician, yet there are things in his writings that favour of enthusiasm and superstition.

TRA-LOS-MONTES, a province of Portugal, called in Latin *Transmontana*, because situated on the east side of a chain of hills that separate it from Entre Duero-e-Mintio. It is bounded on the north by Galicia; on the south by the provinces of Beira and Leon; by the last of which it is bounded also to the east. Its length from north to south is upwards of 120 miles, and its breadth about 80. It is full of mountains, and produces little corn, but plenty of wine, fruits of several sorts, and abundance of game.

TRANSACTIONS, a name generally given to a collection of the papers read before literary or philosophical societies. The name of *Philosophical Transactions* was first adopted by the Royal Society of London. See an account of the Royal Society, Vol. XVII. p. 582.

The Philosophical Transactions to the end of the year 1700 were abridged in three volumes by Mr John Lowthorp: those from the year 1700 to 1720 were abridged in two volumes by Mr Henry Jones: those from 1719 to 1733 were abridged in two volumes by Mr John Eames and Mr John Martyn; Mr Martyn continued the abridgement of those from 1732 to 1744 in two volumes, and of those from 1743 to 1750 in two volumes.

They were for many years published in numbers, and

the printing of them was always, from time to time, the single act of the respective secretaries, till the year 1752, when the society thought fit that a committee should be appointed to reconsider the papers read before them, and to select out of them such as they should judge most proper for publication in the future Transactions. They are published annually in two parts at the expence of the society, and each fellow is entitled to receive one copy *gratis* of every volume published after his admission into the society.

They were first set on foot in 1665, by Mr Oldenburg, secretary of the society, and were continued by him till the year 1677. Upon his death, they were discontinued till January 1678, when Dr Grew resumed the publication of them, and continued it for the months of December 1678, and January and February 1679, after which they were intermitted till January 1683. During this last interval they were supplied in some measure by Dr Hooke's Philosophical Collections. They were also interrupted for three years, from December 1687 to January 1691, beside other smaller interruptions amounting to near one year and a half more, before October 1695, since which time the Transactions have been regularly carried on.

TRANSCENDENTAL, or TRANSCENDENT, something elevated, or raised above other things; which passes and transcends the nature of other inferior things.

TRANSCRIPT, a copy of any original writing, particularly that of an act or instrument inserted in the body of another.

TRANSFER, in commerce, an act whereby a person surrenders his right, interest, or property, in any thing moveable or immoveable to another.

TRANSFORMATION, in general, denotes a change of form, or the assuming a new form different from a former one.

TRANSFUSION, the act of pouring a liquor out of one vessel into another.

TRANSFUSION of Blood, an operation by which it was some time ago imagined that the age of animals would be renewed, and immortality, or the next thing to it, conferred on those who had undergone it.

The method of transfusing Dr Lower gives us to the following effect: take up the carotid artery of the dog, or other animal, whose blood is to be transfused into another of the same, or a different kind; separate it from the nerve of the eighth pair, and lay it bare above an inch. Make a strong ligature on the upper part of the artery; and an inch nearer the heart another ligature with a running knot, to be loosened and fastened as occasion requires. Draw two threads between the two ligatures, open the artery, put in a quill, and tie up the artery again upon the quill by the two threads, and stop the quill by a stick.

Then make bare the jugular vein of the other animal for about an inch and half in length, and at each end make a ligature with a running knot; and in the space between the two knots draw under the veins two threads, as in the other. Open the vein, and put into it two quills, one into the descending part of the vein, to receive the blood from the other dog, and carry it to the heart; the other quill put into the other part of the jugular, towards the head, through which the second animal's own blood is to run into dishes. The quills thus tied fast, stop them up with sticks till there be occasion to open them.

Things thus disposed, fasten the dogs on their sides towards one another, in such manner as that the quills may go into each other; then unstop the quill that goes down into the second dog's jugular vein, as also that coming out of the other dog's artery; and by the help of two or three other

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other quills put into each other, as there shall be occasion, insert them into one another. Then slip the running knots, and immediately the blood runs through the quills as through an artery, very impetuously. As the blood runs into the dog, unstop the quill in the upper part of his jugular, for his own blood to run out at, though not constantly, but as you perceive him able to bear it, till the other dog begins to cry and faint, and at last die. *Lastly*, take both quills out of the jugular, tie the running knot fast, and cut the vein asunder, and sew up the skin: the dog, thus dismissed, will run away as if nothing ailed him.

In the Philosophical Transactions we have accounts of the success of various transfusions practised at London, Paris, in Italy, &c. Sir Edmund King transfused forty-nine ounces of blood out of a calf into a sheep; the sheep, after the operation, appearing as well and as strong as before.

M. Denis transfused the blood of three calves into three dogs, which all continued brisk, and eat as well as before. The same person transfused the blood of four wethers into a horse twenty-six years old, which thence received much strength, and a more than ordinary appetite.

Soon after this operation was introduced at Paris, viz. in 1667 and 1668, M. Denis performed it on five human subjects, two of whom recovered of disorders under which they laboured, one being in perfect health suffered no inconvenience from it; and two persons who were ill, and submitted to the operation, died: in consequence of which the magistrates issued a sentence, prohibiting the transfusion on human bodies under pain of imprisonment.

Mr John Hunter, we are told, made many ingenious experiments to determine the effects of transfusing blood, some of which are sufficient to attract attention. But whether such experiments can ever be made with safety on the human body, is a point not easily determined. They might be allowed in desperate cases proceeding from a corruption of the blood, from poison, &c. as in hydrophobia.

TRANSIT, from *transit*, "it passes over," signifies the passage of any planet over the sun, moon, or stars.

TRANSITION, the passage of any thing from one place to another.

TRANSITION, in oratory. See ORATORY, n° 39.

TRANSITIVE, in grammar, an epithet applied to such verbs as signify an action which passes from the subject that does it, to or upon another subject which receives it. Under the head of verbs transitive come what we usually call *verbs active* and *passive*; other verbs, whose action does not pass out of themselves, are called *neuters*.

TRANSLATION, the act of transferring or removing a thing from one place to another; as we say, the translation of a bishop's see, a council, a seat of justice, &c.

TRANSLATION is also used for the version of a book or writing out of one language into another.

The principles of translation have been clearly and accurately laid down by Dr Campbell of Aberdeen in his invaluable Preliminary Dissertations to his excellent translations of the gospels. The fundamental rules which he establishes are three: 1. That the translation should give a complete transcript of the ideas of the original. 2. That the style and manner of the original should be preserved in the translation. 3. That the translation should have all the ease of original composition. The rules deducible from these general laws are explained and illustrated with much judgment and taste, in a late Essay on the Principles of Translation, by Mr Tytler, judge-advocate of Scotland.

TRANSMARINE, something that comes from or belongs to the parts beyond sea.

TRANSMIGRATION, the removal or translation of a whole people into another country, by the power of a conqueror.

TRANSMIGRATION is particularly used for the passage of the soul out of one body into another. See METEMPSYCHOSIS.

TRANSMUTATION, the act of changing one substance into another.

Nature, says Sir Isaac Newton, is delighted with transmutation: water, which is a fluid, volatile, tasteless, salt, is, by heat, transmuted into vapour, which is a kind of air; and by cold into ice, which is a cold, transparent, brittle stone, easily dissolvable; and this stone is convertible again into water by heat, as vapour is by cold.—Earth, by heat, becomes fire, and, by cold, is turned into earth again: dense bodies, by fermentation, are rarefied into various kinds of air; and that air, by fermentation also, and sometimes without it, reverts into gross bodies. All bodies, beasts, fishes, insects, plants, &c. with all their various parts, grow and increase out of water and aqueous and saline tinctures; and, by putrefaction, all of them revert into water, or an aqueous liquor again.

TRANSMUTATION, in alchemy, denotes the act of changing imperfect metals into gold or silver. This is also called the *grand operation*; and, they say, it is to be effected with the philosopher's stone.

The trick of transmuting cinnabar into silver is thus: the cinnabar, being bruised grossly, is stratified in a crucible with granulated silver, and the crucible placed in a great fire; and, after due time for calcination, taken off; then the matter, being poured out, is found to be cinnabar turned into real silver, though the silver grains appear in the same number and form as when they were put into the crucible; but the mischief is, coming to handle the grains of silver, you find them nothing but light friable bladders, which will crumble to pieces between the fingers.

The transmutability of water into earth seems to have been believed by Mr Boyle; and Bishop Watson thinks that it has not yet been disproved. See his *Chemical Essays*.

TRANSMUTATION of Acids. See CHEMISTRY-Index.

TRANSMUTATION of Metals. See CHEMISTRY-Index.

TRANSOM, among builders, denotes the piece that is framed across a double-light window.

TRANSOMS, in a ship, certain beams or timbers extended across the sternpost of a ship, to fortify her afterpart, and give it the figure most suitable to the service for which she is calculated.

TRANSPARENCY, in physics, a quality in certain bodies, whereby they give passage to the rays of light; in contradistinction to opacity, or that quality of bodies which renders them impervious to the rays of light.

It has been generally supposed by philosophers, that transparent bodies have their pores disposed in straight lines, by which means the rays of light have an opportunity of penetrating them in all directions; but some experiments in electricity have made it apparent, that by the action of this fluid the most opaque bodies, such as sulphur, pitch, and sealing-wax, may be rendered transparent as glass, while yet we cannot suppose the direction of their pores to be any way altered from what it originally was (see ELECTRICITY, n° 4.) A curious instance of an increase of transparency we have in rubbing a piece of white paper over one that has been written upon or printed: while the white paper is at rest, the writing or print will perhaps scarce appear through it; but when in motion, will be very easily legible, and continue so till the motion is discontinued.

TRANSPOSITION, in grammar, a disturbing or dislocating

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Trapp.

cating the words of a discourse, or a changing their natural order of construction, to please the ear by rendering the contexture more smooth, easy, and harmonious.

TRANSUBSTANTIATION, in theology, the conversion or change of the substance of the bread and wine in the eucharist, into the body and blood of Jesus Christ; which the Romish church suppose to be wrought by the consecration of the priest. See *SUPPER of the Lord*, n° 5.

TRANSVERSALIS, in anatomy, a name given to several muscles. See *ANATOMY*, Part II.

TRANSVERSE, something that goes across another from corner to corner: thus bends and bars in heraldry are transverse pieces or bearings; the diagonals of a parallelogram or a square are transverse lines.

TRANSYLVANIA, a province of Europe, annexed to Hungary, and bounded on the north by Upper Hungary and Poland, on the east by Moldavia and Walachia, on the south by Walachia, and on the west by Upper and Lower Hungary. It is surrounded on all parts by high mountains, which, however, are not barren. The inhabitants have as much corn and wine as they want themselves; and there are rich mines of gold, silver, lead, copper, quicksilver, and alum. It has undergone various revolutions; but it now belongs to the house of Austria. The inhabitants are of several sorts of religions; as Papists, Lutherans, Calvinists, Socinians, Photinians, Arians, Greeks, and Mahometans. It is about 162 miles in length, and 150 in breadth. The administration of affairs is conducted by 12 persons; namely, three Roman Catholics, three Lutherans, three Calvinists, and three Socinians. The militia is commanded by the governor, whose commission is the more important, as Transylvania is the bulwark of Christendom. It is divided into several small districts, called *palatinates* and *counties*; and is inhabited by three different nations, Saxons, Sicilians, and Hungarians. Hermanstadt is the capital town.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines.

TRAPEZIUS, a muscle. See *ANATOMY*, Part II.

TRAPP (Dr Joseph), an English divine of excellent parts and learning, was born at Cherington in Gloucestershire, of which place his father was rector in 1579. He was the first person chosen to the professorship of poetry founded at Oxford by Dr Birkhead; and published his lectures under the title of *Prælectiones Poeticæ*, in which he laid down excellent rules for every species of poetry in very elegant Latin. He showed afterwards, however, by his translation of Virgil, that a man may be able to direct who cannot execute, and may have the critic's judgment without the poet's fire. In the early part of his life Dr Trapp is said to have been chaplain to the father of the famous Lord Bolingbroke: he obtained the living of Christ-church in Newgate Street, and St Leonard's, Foster-lane, London; and his very high-church principles probably obstructed his farther preferment. He published several occasional poems, a tragedy called *Abramule*, translated Milton's *Paradise Lost* into Latin verse, and died in 1747.

TRAPP, in mineralogy, a species of siliceous earth. It is described by Dr Kirwan as nearly the same with basalt: a dark grey or black stone, generally invested with a ferruginous crust, and crystallized in opaque, triangular, or polyangular columns, is called *basalt*; that which is amorphous, or breaks in large, thick, square pieces, is called *trapp*. Their constituent principles, and relation to acids and fluxes, are exactly the same. The texture of this stone is either coarse, rough, and distinct, or fine and indiscernible. It is often reddish; it is always opaque, and moulders by exposure to the air; some specimens give fire with steel very difficultly, though

it is always very compact; sometimes it is sprinkled over with a few minute shining particles: its specific gravity is 3000.

When heated red-hot, and quenched in water, it becomes by degrees of a reddish brown colour: it melts *per se* in a strong heat into a compact slag. Borax also dissolves it in fusion, but mineral alkali not entirely.

According to Mr Bergman, 100 parts of the basalt contain 52 of siliceous earth, 15 of argil, 8 of calcareous, 2 of magnesia, and 25 of iron; and with this Mr Meyer very nearly agrees.

For a more complete account of this species of stone, see M. Faujas de St Fond on the *Nat. Hist. of Trapp*.

TRAVELLERS JOY. See *CLEMATIS*.

TRAVERSE, or **TRANSVERSE**, in general, denotes something that goes athwart another; that is, crosses and cuts it obliquely.

TRAVERSE, in navigation, implies a compound course, or an assemblage of various courses, lying at different angles with the meridian. See *NAVIGATION*, p. 688.

TRAVERSE Board, a thin circular piece of board, marked with all the points of the compass, and having eight holes bored in each, and eight small pegs hanging from the centre of the board. It is used to determine the different courses run by a ship during the period of the watch, and to ascertain the distance of each course.

TRAVESTY, a name given to an humorous translation of any author. The word is derived from the French *travester* "to disguise."

TRAUMATIC BALSAM. See *PHARMACY*, n° 428.

TREACLE. See *THERIACA*.—Some also give the name *treacle* to melasses. See *PHARMACY*, n° 605.

TREACLE Beer. See *SPRUCE*.

TREACLE Mustard. See *CLYPEOLA*.

TREASON, a general appellation, made use of by the law, to denote not only offences against the king and government, but also that accumulation of guilt which arises whenever a superior reposes a confidence in a subject or inferior, between whom and himself there subsists a natural, a civil, or even a spiritual relation; and the inferior so abuses that confidence, so forgets the obligations of duty, subjection, and allegiance, as to destroy the life of any such superior or lord. Hence treason is of two kinds, *high* and *petty*.

High Treason, or *Treason Paramount* (which is equivalent to the *crimen læsæ majestatis* of the Romans, as Glanvil denominates it also in our English law), is an offence committed against the security of the king or kingdom, whether by imagination, word, or deed. In order to prevent the inconveniences which arose in England from a multitude of constructive treasons, the statute 25 Edw. III. c. 2. was made; which defines what offences only for the future should be held to be treason; and this statute comprehends all kinds of high-treason under seven distinct branches.

"1. When a man doth compass or imagine the death of our lord the king, of our lady his queen, or of their eldest son and heir." Under this description it is held that a queen-regnant (such as Queen Elizabeth and Queen Anne) is within the words of the act, being invested with royal power, and intitled to the allegiance of her subject: but the husband of such a queen is not comprised within these words; and therefore no treason can be committed against him.

Let us next see what is a *compassing* or *imagining* the death of the king, &c. These are synonymous terms: the word *compass* signifying the purpose or design of the mind or will; and not, as in common speech, the carrying such design to effect. And therefore an accidental stroke, which may

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Treason.

Treason. may mortally wound the sovereign, *per infortuniam*, without any traitorous intent, is no treason: as was the case of Sir Walter Tyrrel, who, by the command of King William Rufus, shooting at a hart, the arrow glanced against a tree, and killed the king upon the spot. But as this compassing or imagination is an act of the mind, it cannot possibly fall under any judicial cognizance, unless it be demonstrated by some open or overt act. The statute expressly requires, that the accused "be thereof upon sufficient proof attainted of some open act by men of his own condition." Thus, to provide weapons or ammunition for the purpose of killing the king, is held to be a palpable overt act of treason in imagining his death. To conspire to imprison the king by force, and move towards it by assembling company, is an overt act of compassing the king's death; for all force, used to the person of the king, in its consequence may tend to his death, and is a strong presumption of something worse intended than the present force, by such as have so far thrown off their bounden duty to their sovereign: it being an old observation, that there is generally but a short interval between the prisons and the graves of princes. It seems clearly to be agreed, that by the common law and the statute of Edw. III. words spoken amount only to a high misdemeanor, and no treason. For they may be spoken in heat, without any intention; or be mistaken, perverted, or misremembered by the hearers; their meaning depends always on their connection with other words and things; they may signify differently even according to the tone of voice with which they are delivered; and sometimes silence itself is more expressive than any discourse. As therefore there can be nothing more equivocal and ambiguous than words, it would indeed be unreasonable to make them amount to high treason. And accordingly, in 4 Car. I. on a reference to all the judges, concerning some very atrocious words spoken by one Pyne, they certified to the king, "that though the words were as wicked as might be, yet they were no treason; for unless it be by some particular statute, no words will be treason." If the words be set down in writing, it argues more deliberate intention; and it has been held, that writing is an overt act of treason; for *scribere est agere*. But even in this case the bare words are not the treason, but the deliberate act of writing them.

2. The second species of treason is, "if a man do violate the king's companion, or the king's eldest daughter unmarried, or the wife of the king's eldest son and heir." By the king's companion is meant his wife; and by violation is understood carnal knowledge, as well without force as with it: and this is high treason in both parties if both be consenting; as some of the wives of Henry VIII. by fatal experience evinced.

3. The third species of treason is, "if a man do levy war against our lord the king in his realm." And this may be done by taking arms, not only to dethrone the king, but under pretence to reform religion, or the laws, or to remove evil counsellors, or other grievances whether real or pretended. For the law does not, neither can it, permit any private man, or set of men, to interfere forcibly in matters of such high importance; especially as it has established a sufficient power for these purposes in the high court of parliament: neither does the constitution justify any private or particular resistance for private or particular grievances; though, in cases of national oppression, the nation has very justifiably risen as one man, to vindicate the original contract subsisting between the king and his people.

4. "If a man be adherent to the king's enemies in his realm, giving to them aid and comfort in the realm or elsewhere," he is also declared guilty of high-treason. This

must likewise be proved by some overt act; as by giving them intelligence, by sending them provisions, by selling them arms, by treacherously surrendering a fortress, or the like.

5. "If a man counterfeit the king's great or privy seal," this is also high-treason. But if a man takes wax bearing the impression of the great seal off from one patent and fixes it to another, this is held to be only an abuse of the seal, and not a counterfeiting of it: as was the case of a certain chaplain, who in such a manner framed a dispensation for non-residence. But the knavish artifice of a lawyer much exceeded this of the divine. One of the clerks in chancery glued together two pieces of parchment; on the uppermost of which he wrote a patent, to which he regularly obtained the great seal, the label going through both the skins. He then dissolved the cement, and taking off the written patent, on the blank skin, wrote a fresh patent of a different import from the former, and published it as true. This was held no counterfeiting of the great seal, but only a great misprision; and Sir Edward Coke mentions it with some indignation that the party was living at that day.

6. The sixth species of treason under this statute is, "if a man counterfeit the king's money; and if a man bring false money into the realm counterfeit to the money of England, knowing the money to be false, to merchandise and make payment withal." As to the first branch, counterfeiting the king's money; this is treason, whether the false money be uttered in payment or not. Also if the king's own minters alter the standard or alloy established by law, it is treason. But gold and silver money only are held to be within this statute. With regard likewise to the second branch, importing foreign counterfeit money in order to utter it here; it is held that uttering it, without importing it, is not within the statute.

7. The last species of treason ascertained by this statute is, "if a man slay the chancellor, treasurer, or the king's justices of the one bench or the other, justices in eyre, or justices of assize, and all other justices assigned to hear and determine, being in their places doing their offices." These high magistrates, as they represent the king's majesty during the execution of their offices, are therefore for the time equally regarded by the law. But this statute extends only to the actual killing of them; and not to wounding, or a bare attempt to kill them. It extends also only to the officers therein specified; and therefore the barons of the exchequer, as such, are not within the protection of this act; but the lord keeper or commissioners of the great seal now seem to be within it, by virtue of the statutes 5 Eliz. c. 18. and 1 W. and M. c. 21.

The new treasons, created since the statute 1 M. c. 1. and not comprehended under the description of statute 25 Edw. III. may be comprised under three heads. The first species relates to Papists; the second to falsifying the coin or other royal signatures, as falsely forging the sign manual, privy signet, or privy seal, which shall be deemed high treason (1 M. stat. ii. c. 6.) The third new species of high treason is such as was created for the security of the Protestant succession in the house of Hanover. For this purpose, after the act of settlement was made, it was enacted by statute 13 and 14 W. III. c. 3. that the pretended prince of Wales, assuming the title of King James III. should be attainted of high treason; and it was made high-treason for any of the king's subjects to hold correspondence with him or any person employed by him, or to remit money for his use. And by 17 Geo. II. c. 39. it is enacted, that if any of the sons of the pretender shall land or attempt to land in this kingdom, or be found in the kingdom or any of its dominions, he shall be adjudged attainted of high-treason; and

Treason.

Treason corresponding with them or remitting money to their use is made high-treason. By 1 Ann. stat. 2. c. 17. the offence of hindering the next in succession from succeeding to the crown is high-treason: and by 6 Ann. c. 7. if any person shall maliciously, advisedly, and directly, by writing or printing, maintain, that any other person hath any right to the crown of this realm, otherwise than according to the act of settlement, or that the kings of this realm with the authority of parliament are not able to make laws to bind the crown and its descent; such person shall be guilty of high-treason.

The punishment of high treason in general is very solemn and terrible. 1. That the offender be drawn to the gallows, and not be carried or walk; though usually (by connivance, at length ripened by humanity into law) a sledge or hurdle is allowed, to preserve the offender from the extreme torment of being dragged on the ground or pavement. 2. That he be hanged by the neck, and then cut down alive. 3. That his entrails be taken out, and burned while he is yet alive. 4. That his head be cut off. 5. That his body be divided into four parts. 6. That his head and quarters be at the king's disposal.

The king may, and often doth, discharge all the punishment except beheading, especially where any of noble blood are attainted. For beheading being part of the judgment, that may be executed, though all the rest be omitted by the king's command. But where beheading is no part of the judgment, as in murder or other felonies, it hath been said that the king cannot change the judgment, although at the request of the party, from one species of death to another.

In the case of coining, which is a treason of a different complexion from the rest, the punishment is milder for male offenders; being only to be drawn and hanged by the neck till dead. But in treasons of every kind the punishment of women is the same, and different from that of men. For as the natural modesty of the sex forbids the exposing and publicly mangling their bodies, their sentence (which is to the full as terrible to sense as the other) is to be drawn to the gallows, and there to be burned alive.

For the consequences of this judgment, see **ATTAINDER**, **FORFEITURE**, and **CORRUPTION of Blood**.

Petty or Petit Treason, according to the statute 25 Edward III. c. 2. may happen three ways: by a servant killing his master, a wife her husband, or an ecclesiastical person (either secular or regular) his superior, to whom he owes faith and obedience. A servant who kills his master whom he has left, upon a grudge conceived against him during his service, is guilty of petty treason: for the traitorous intention was hatched while the relation subsisted between them, and this is only an execution of that intention. So if a wife be divorced *a mense et thoro*, still the *vinculum matrimonii* subsists; and if she kills such divorced husband, she is a traitress. And a clergyman is understood to owe canonical obedience to the bishop who ordained him, to him in whose diocese he is beneficed, and also to the metropolitan of such suffragan or diocesan bishop; and therefore to kill any of these is petty treason. As to the rest, whatever has been said with respect to wilful **MURDER**, is also applicable to the crime of petty treason, which is no other than murder in its most odious degree; except that the trial shall be as in cases of high treason, before the improvements therein made by the statutes of William III. But a person indicted of petty treason may be acquitted thereof, and found guilty of manslaughter or murder: and in such case it should seem that two witnesses are not necessary, as in cases of petty treason they are. Which crime is also distinguished from murder in its punishment.

The punishment of petit treason in a man, is to be drawn and hanged, and in a woman to be drawn and burned: the idea of which latter punishment seems to have been handed down to us from the laws of the ancient Druids, which condemned a woman to be burned for murdering her husband; and it is now the usual punishment for all sorts of treasons committed by those of the female sex. Persons guilty of petit treason were first debarred the benefit of clergy by statute 12 Henry VII. c. 7. which has since been extended to their aiders, abettors, and counsellors, by statutes 23 Henry VIII. c. 1, and 4 & 5 P. and M. c. 4.

TREASURE, in general, denotes a store or stock of money in reserve.

TREASURE-Trove, in law, derived from the French word *trouver*, "to find," called in Latin *thesaurus inventus*, is where any money or coin, gold, silver, plate, or bullion, is found hidden in the earth or other private place, the owner thereof being unknown; in which case the treasure belongs to the king: but if he that hid it be known, or afterwards found out, the owner and not the king is intitled to it.

TREASURER, an officer to whom the treasure of a prince or corporation is committed to be kept and duly disposed of, in payment of officers and other expences. See **TREASURY**.

Of these there is a great variety. His majesty of Great Britain, in quality of elector of Brunswick, is arch-treasurer of the Roman empire. In England, the principal officers under this denomination are, the lord high-treasurer, the treasurer of the household, treasurer of the navy, of the king's chamber, &c.

The lord high-treasurer of Great Britain, or first commissioner of the treasury, when in commission, has under his charge and government all the king's revenue which is kept in the exchequer. He holds his place during the king's pleasure; being instituted by the delivery of a white staff to him. He has the check of all the officers employed in collecting the customs and royal revenues: and in his gift and disposition are all the offices of the customs in the several ports of the kingdom; elcheators in every county are nominated by him; he also makes leases of the lands belonging to the crown.

The office of lord-treasurer is now in commission. The number of lords commissioners is five; one of whom is the first lord, whose annual salary was formerly L. 383, but is now L. 4000; and who, unless he be a peer, is also chancellor of the exchequer, and prime minister in the government of this country; the other lords commissioners have an annual salary of L. 1600 each.

TREASURER of the Household, is an officer who, in the absence of the lord-steward, has power, with the comptroller and other officers of the green-cloth and the steward of the Marshalsea, to hear and determine treasons, felonies, and other crimes committed within the king's palace. See **HOUSEHOLD**.

There is also a treasurer belonging to the establishment of her majesty's household, &c.

TREASURER of the Navy, is an officer who receives money out of the exchequer, by warrant from the lord high-treasurer, or the lords commissioners executing that place; and pays all charges of the navy, by warrant from the principal officers of the navy.

TREASURER of the County, he that keeps the county stock. There are two of them in each county, chosen by the major part of the justices of the peace, &c. at their general quarter session; under previous security given for the money entrusted with them, and the faithful execution of the trusts reposed in them.

TREASURY, the place wherein the revenues of a prince are

Treasure
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Treasury.

Treatise
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Tree.

Tree.

are received, preserved, and disbursed. In England the treasury is a part of the exchequer; by some called the *lower exchequer*. The officers of his majesty's treasury, or the lower exchequer, are the lords commissioners, one of whom is chancellor, two joint secretaries, private secretary to the first lord, two chamberlains, an auditor, four tellers, a clerk of the pells, ushers of the receipt, a tally-cutter, &c. See each officer under his proper article, CHANCELLOR, TELLER, TALLY, &c.

Lords of the Treasury. In lieu of one single director and administrator of his majesty's revenues under the title of *lord high treasurer*, it is at present thought proper to put that office in commission, *i. e.* to appoint several persons to discharge it with equal authority, under the title of *lords commissioners of the treasury*.

TREATISE, a set discourse in writing on any subject.

TREATY, a covenant between two or more nations; or the several articles or conditions stipulated and agreed upon between sovereign powers.

TREBLE, in music, the highest or most acute of the four parts in symphony, or that which is heard the clearest and shrillest in a concert.

TREBUCHET, TREBUCKET, *Tribuch* (*Terbichetum*), a tumbrel or cucking stool. Also a great engine to cast stones to batter walls.

TREE, a large vegetable rising with one woody stem to a considerable height.

Trees may be divided into two classes, *timber* and *fruit-trees*; the first including all those trees which are used in machinery, ship-building, &c. or, in general, for purposes of utility; and the second comprehending those trees valued only, or chiefly, for their fruit. It is not necessary to form a third class to include trees used for fuel, as timber is used for this purpose where it is abundant; and where it is not abundant the branches of the timber trees, or such of them as are dwarfish, unhealthy, or too small for mechanical purposes, are used as fuel.

The anatomy and physiology of trees have already been given under the generic name PLANT and SAP. For an account of their natural history, see NATURAL HISTORY, sect. iii.

Certain trees, it is well known, are natives of particular districts; but many of them have been transplanted from their native soil, and now flourish luxuriantly in distant countries, so that it becomes a matter of very considerable difficulty to ascertain their original soil. The following rules are given for this purpose by the Honourable Daines Barrington.

1. They must grow in large masses, and cover considerable tracts of ground, the woods not ending abruptly, by a change to other trees, except the situation and strata become totally different. 2. They must grow kindly in copses, and shoot from the stool, so as to continue for ever, if not very carefully grubbed up. 3. The seed must ripen kindly; nature never plants, but where a succession in the greatest profusion will continue. Lastly, trees that give names to many places are probably indigenous.

The growth of trees is a curious and interesting subject; yet few experiments have been made to determine what the additions are which a tree receives annually in different periods of its age. The only observations which we have seen on this subject worth repeating were made by the ingenious Mr Barker, to whom the Philosophical Transactions are much indebted for papers containing an accurate register of the weather, which he has kept for many years. He has drawn up a table to point out the growth of three kinds of trees, oaks, ashes, and elms; which may be seen in the Philo-

phical Transactions for 1788. We shall give his conclusions.

"I find (says he) the growth of oak and ash to be nearly the same. I have some of both sorts planted at the same time, and in the same hedges, of which the oaks are the largest; but there is no certain rule as to that. The common growth of an oak or an ash is about an inch in girth in a year: some thriving ones will grow an inch and a half; the unthriving ones not so much. Great trees grow more timber in a year than small ones; for if the annual growth be an inch, a coat of one-sixth of an inch is laid on all round, and the timber added to the body every year is its length multiplied into the thickness of the coat and into the girth, and therefore the thicker the tree is, the more timber is added."

We will present our readers with a table, showing the growth of 17 kinds of trees for two years. The trees grew at Cavenham in Suffolk.

No		July 1785.		July 1786.		July 1787.	
		F.	In.	F.	In.	F.	In.
1	Oak	0	10 $\frac{1}{2}$	0	11 $\frac{1}{2}$	1	0 $\frac{1}{2}$
2	Larch	1	0 $\frac{1}{2}$	1	3	1	4
3	Scotch fir	1	3 $\frac{1}{2}$	1	5 $\frac{1}{2}$	1	7 $\frac{1}{2}$
4	Spruce fir	0	5 $\frac{1}{2}$	0	6 $\frac{1}{2}$	0	7 $\frac{1}{2}$
5	Spanish chefnut	0	7 $\frac{1}{2}$	0	7 $\frac{1}{2}$	0	8
6	Elm	2	7 $\frac{1}{2}$	2	9	2	11
7	Pinaster	2	3 $\frac{1}{2}$	2	4 $\frac{1}{2}$	2	7 $\frac{1}{2}$
8	Larch	1	5 $\frac{1}{2}$	1	6	1	7
9	Weymouth pine	0	5	0	6	0	7 $\frac{1}{2}$
10	Acacia	1	2 $\frac{1}{2}$	1	5 $\frac{1}{2}$	1	6 $\frac{1}{2}$
11	Beech	0	6 $\frac{1}{2}$	0	6 $\frac{1}{2}$	0	7 $\frac{1}{2}$
12	Plane occidental	0	6 $\frac{1}{2}$	0	7 $\frac{1}{2}$	0	8 $\frac{1}{2}$
13	Lombardy poplar	1	8	2	0	2	3 $\frac{1}{2}$
14	Black poplar	1	2 $\frac{1}{2}$	1	4 $\frac{1}{2}$	1	5 $\frac{1}{2}$
15	Willow	2	9 $\frac{1}{2}$	3	2	3	3
16	Silver fir	0	7 $\frac{1}{2}$	0	8 $\frac{1}{2}$	0	9 $\frac{1}{2}$
17	Lime	1	8 $\frac{1}{2}$	1	10 $\frac{1}{2}$	2	0

See HUSBANDRY, n° 165, where the growth of 11 kinds of trees in 21 years is given.

Trees sometimes attain a very great size: this must depend in a great measure on the richness of soil, but no less on the degree of heat. Indeed heat is so essential to the growth of trees, that as we go from the place within the polar circles where vegetation begins, and advance to the equator, we find the trees increase in size. Greenland, Iceland, and other places in the same latitude, yield no trees at all; and the shrubs which they produce are dwarfish; whereas, in warm climates, they often grow to an immense size. Mr Marsham saw spruce and silver-firs in the dock-yard in Venice above 40 yards long, and one of 39 yards was 18 inches diameter at the small end. He was informed that they came from Switzerland.

The largest tree in Europe, mentioned by travellers, is the chefnut tree on mount Etna, already described under the article ETNA, n° 18. It is a certain fact that trees acquire a very great size in volcanic countries. Beside the multitude of fine groves in the neighbourhood of Albano in Italy, there are many detached oaks 20 feet in circumference, and many elms of the same size, especially in the romantic way to Eastello, called the *Galleria*. In travelling by the side of the lake of Bolsena, the road leads us through an immense number of oaks, spread upon beautiful hills. Where the lava has been sufficiently softened, they are clean and straight, and of a considerable size; but where the lava has not been converted into a soil proper for strong vegetation, they are round-headed, and of less bigness; however, taken all together, they make a magnificent appearance;

Tree.

ance; and the spot itself ought to ranked among the fine parts of Italy. The same may be observed of the small lake of Vico, encompassed with gentle risings, that are all clothed with forest-trees.

Some yews have been found in Britain 60 feet round. Palms in Jamaica attain the height of 200 feet; and some of the pines in Norfolk-Island are 280 feet high.

Of all the different kinds known in Europe, oak is best for building; and even when it lies exposed to air and water, there is none equal to it. Fir-timber is the next in degree of goodness for building, especially in England, where they build upon leases. It differs from oak in this, that it requires not much seasoning, and therefore no great stock is required before hand. Fir is used for flooring, wainscoting, and the ornamental parts of building within doors. Elm is the next in use, especially in England and France: it is very tough and pliable, and therefore easily worked: it does not readily split; and it bears driving of bolts and nails better than any other wood; for which reason it is chiefly used by wheel-wrights and coach-makers, for shafts, naves, &c. Beech is also used for many purposes: it is very tough and white when young, and of great strength; but liable to warp very much when exposed to the weather, and to be worm-eaten when used within doors; its greatest use is for planks, bedsteads, chairs, and other household goods. Ash is likewise a very useful wood, but very scarce in most parts of Europe; it serves in buildings, or for any other use, when screened from the weather; handspikes and oars are chiefly made of it. Wild chestnut timber is by many esteemed to be as good as oak, and seems to have been much used in old buildings; but whether these trees are more scarce at present than formerly, or have been found not to answer so well as was imagined, it is certain that this timber is now but little used. Walnut-tree is excellent for the joiner's use, it being of a more curious brown colour than beech, and not so subject to the worms. The poplar, alder, and aspen trees, which are very little different from each other, are much used instead of fir; they look well, and are tougher and harder. See QUERCUS, OAK, PINUS, ULMUS, PLATANUS, POPULUS, &c.

The goodness of timber not only depends on the soil and situation in which it stands, but likewise on the season wherein it is felled. In this people disagree very much; some are for having it felled as soon as its fruit is ripe, others in the spring, and many in the autumn. But as the sap and moisture of timber is certainly the cause that it perishes much sooner than it otherwise would do, it seems evident, that timber should be felled when there is the least sap in it, viz. from the time that the leaves begin to fall till the trees begin to bud. This work usually commences about the end of April in England, because the bark then rises most freely; for where a quantity of timber is to be felled, the statute requires it to be done then, for the advantage of tanning. The ancients chiefly regarded the age of the moon in felling their timber; their rule was to fell it in the wane, or four days after the new moon, or sometimes in the last quarter. Pliny advises it to be in the very instant of the change; which happening to be in the last day of the winter solstice, the timber, says he, will be incorruptible.

Timber should likewise be cut when of a proper age; for when it is either too young or too old, it will not be so durable as when cut at a proper age. It is said that oak should not be cut under 60 years old, nor above 200. Timber, however, should be cut in its prime, when almost fully grown, and before it begins to decay; and this will be sooner or later according to the dryness and moistness of the soil where the timber grows, as also according to the bigness of

the trees; for there are no fixed rules in felling of timber, experience and judgment must direct here as in most other cases.

Great attention is necessary in the seasoning of timber. Some advise the planks of timber to be laid for a few days in some pool or running stream, in order to extract the sap, and afterwards to dry them in the sun or air. By this means, it is said, they will be prevented from either chopping, casting, or cleaving; but against shrinking there is no remedy. Some again are for burying them in the earth, others in a heat; and some for scorching and seasoning them in fire, especially piles, posts, &c. which are to stand in water or earth. The Venetians first found out the method of seasoning by fire; which is done after this manner: They put the piece to be seasoned into a strong and violent flame; in this they continually turn it round by means of an engine, and take it out when it is everywhere covered with a black coaly crust; the internal part of the wood is thereby so hardened, that neither earth nor water can damage it for a long time afterwards.

Dr Plott says, it is found by long experience, that the trunk or body of the trees, when barked in the spring, and left standing naked all the summer exposed to the sun and wind, are so dried and hardened, that the sappy part in a manner becomes as firm and durable as the heart itself. This is confirmed by M. Buffon, who, in 1738, presented to the royal academy of sciences at Paris a memoir, intitled, "An easy method of increasing the solidity, strength, and duration of timber;" for which purpose he observes, "nothing more is necessary than to strip the tree entirely of its bark during the season of the rising of the sap, and to leave it to dry completely before it be cut down."

By many experiments, particularly described in that essay, it appears, that the tree should not be felled till the third year after it has been stripped of the bark; that it is then perfectly dry, and the sap become almost as strong as the rest of the timber, and stronger than the heart of any other oak tree which has not been so stripped; and the whole of the timber stronger, heavier, and harder; from which he thinks it fair to conclude, that it is also more durable. "It would no longer (he adds) be necessary, if this method were practised, to cut off the sap; the whole of the tree might be used as timber; one of 40 years growth would serve all the purposes for which one of 60 years is now required; and this practice would have the double advantage of increasing the quantity, as well as the strength and solidity, of the timber."

The navy board, in answer to the inquiries of the commissioners of the land revenue, in May 1789, informed them, that they had then standing some trees stripped of their bark two years before, in order to try the experiment of building one half of a sloop of war with that timber, and the other half with timber felled and stripped in the common way. This very judicious mode of making the experiment, if it be properly executed, will undoubtedly go far to ascertain the effects of this practice. We are sorry that we are not able to inform our readers what was the result of the experiment.

After the planks of timber have been well seasoned and fixed in their places, care is to be taken to defend or preserve them; to which the smearing them with linseed oil, tar, or the like oleaginous matter, contributes much. The ancients, particularly Hesiod and Virgil, advise the smoke-drying of all instruments made of wood, by hanging them up in the chimneys where wood fires are used. The Dutch preserve their gates, portcullises, drawbridges, sluices, &c. by coating them over with a mixture of pitch and tar, whereon they strew small pieces of cockle and other shells, beaten

Tree.

Tree. beaten almost to powder, and mixed with sea sand, which incrusts and arms them wonderfully against all assaults of wind and weather. When timber is felled before the sap is perfectly at rest, it is very subject to worms; but to prevent and cure this, Mr Evelyn recommends the following remedy as the most approved: Put common sulphur into a cucurbit, with as much aquafortis as will cover it three fingers deep; distil it to dryness, which is performed by two or three rectifications. Lay the sulphur that remains at bottom, being of a blackish or sand-red colour, on a marble, or put it in a glass, and it will dissolve into an oil; with this oil anoint the timber which is infected with worms. This, he says, will not only prevent worms, but preserve all kinds of woods, and many other things, as ropes, nets, and masts, from putrefaction, either in water, air, or snow.

Annals of Agriculture, vol. vi. p. 256. An experiment to determine the comparative durability of different kinds of timber, when exposed to the weather, was made by a nobleman in Norfolk; of which an account is given by Sir Thomas Beevor. This nobleman, in the year 1774, ordered three posts, forming two sides of a quadrangle, to be fixed in the earth on a rising ground in his park. Into these posts were mortised planks, an inch and an half thick, cut out of trees from 30 to 45 years growth. These, after standing 10 years, were examined, and found in the following state and condition:

The cedar was perfectly sound; larch, the heart sound, but the sap quite decayed; spruce fir, sound; silver fir, in decay; Scotch fir, much decayed; pinaster, quite rotten; chestnut, perfectly sound; abele, sound; beech, sound; walnut, in decay; sycamore, much decayed; birch, quite rotten. Sir Thomas Beevor justly remarks, that the trees ought to have been of the same age; and Mr Arthur Young adds, they ought to have been cut out of the same plantation.

The immense quantity of timber consumed of late years in ship-building and other purposes has diminished in a very great degree the quantity produced in this country. On this account, many gentlemen who wish well to their country, alarmed with the fear of a scarcity, have strongly recommended it to government to pay some attention to the cultivation and preservation of timber.

Eleventh Report. We find, on the best authority, that of Mr Irving inspector general of imports and exports, that the shipping of England in 1760 amounted to 6,107 in number, the tonnage being 433,922; and the shipping in Scotland amounted to 976 in number, the tonnage being 52,818. In 1788 the whole shipping of Britain and Ireland and their colonies amounted to 13,800, being 1,359,752 tons burden, and employing 107,925 men. The tonnage of the royal navy in the same year was 413,667. We are informed also, on what we consider as the best authority (the report of the commissioners of the land revenue), that the quantity of oak timber, of English growth, delivered into the dockyards from 1760 to 1788 was no less than 768,676 loads, and that the quantity used in the merchants yards in the same time was 516,630 loads; in all 1,285,306 loads. The foreign oak used in the same period was only 137,766 loads. So that, after deducting the quantity remaining in the dockyards in 1760 and 1788, and the foreign oak, there will remain about 1,054,284 loads of English oak, consumed in 28 years, which is at an average 37,653 loads *per an-*

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num, besides from 8,300 to 10,000 loads expended annually by the East India company within the same period (A).

Tree. The price of wood has risen in proportion to the demand and to its diminution. At the conquest, woods were valued, not by the quantity of timber which they contained, but the number of wine which the acorns could support. In 1608, oak in the forests was sold at 10s. *per* load, and fire-wood for 2s. *per* load. In 1663 or 1665, in navy contracts from L. 2 to 2l. 15s. 6d. *per* load was given. In 1756 it rose to 4l. 5s. *per* load, and 3s. in addition, because no tops are received. Plank four inch sold in 1769 for L. 7 a load, three inch L. 6; which prices were the same in 1792.

So great an expenditure of valuable timber within so short a period, gives reason to fear that the forests of this country will soon be entirely dismantled, unless something is done to raise fresh supplies. The building of a 70 gun ship, it is said, would take 40 acres of timber. This calculation is indeed so excessive, that it is scarcely credible. This, however, is no exaggeration. According to the prevailing opinion of experienced surveyors, it will require a good soil and good management to produce 40 trees on an acre, which, in a hundred years, may, at an average, be computed at two loads each. Reckoning, therefore, two loads at 8l. 16s. one acre will be worth L. 350, and consequently 40 acres will only be worth L. 14,200. Now a 70 gun ship is generally supposed to cost L. 70,000; and as ships do not last a great many years, the navy continually requires new ships, so that the forests must be stripped in a century or two, unless young trees are planted to supply their place.

Many plans have been proposed for recruiting the forests. Premiums have been held forth to individuals; and it has been proposed that the crown-lands should be set apart for the special purpose of raising timber. With respect to individuals, as they must generally be disposed to sow or plant their lands with those vegetables which will best reward their labours, it is not to be expected that they will set apart their fields for planting trees unless they have a greater return from them than other crops. But bad must that land be which will not yield much more than L. 350 produce in 100 years. But though it be evident that good land will produce crops much more lucrative to the proprietor than timber, yet still there are lands or pieces of land which might be applied with very great advantage to the production of wood. Uneven ground, or the sides of fields where corn cannot be cultivated, might very properly be set apart for this purpose; barren lands, or such as cannot be cultivated without great labour and expence, might also be planted. Hedge-rows and clumps of trees, and little woods scattered up and down, would shelter and defend the fields from destructive winds, would beautify the face of the country, render the climate warmer, improve barren lands, and furnish wood for the arts and manufactures.

But to cultivate forest timber has also been thought of such national importance, that it has been deemed worthy of the attention of government. It has been proposed to appropriate such part of the crown-lands as are fit for the purpose solely for producing timber for the navy. This appears a very proper scheme in speculation; but it has been objected, that for government to attempt the farming of forests would be really to establish groups of officers to pocket salaries for doing what, it is well known, will never

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(A) A writer in the Bath Transactions says, that the aggregate of oaks felled in England and Wales for 30 years past hath amounted to 320,000 loads a year; and affirms that he has documents in his possession founded on indisputable facts. The difference between this account, and that which we have given in the text from the report of the commissioners, we leave to be reconciled by those who have proper opportunities. We give the facts merely on the authority of others.

Tree.

be done at all. But to this objection we reply, that such an agreement might be made with the inspectors of forests, as to make it their own interest to cultivate trees with as much care as possible. Their salary might be fixed very low, and raised in proportion to the number of trees which they could furnish of such a size in a certain number of years. After all, we must acknowledge, that we must depend greatly on Russia, Sweden, Norway, and America, for supplying us with timber; and while these countries take our manufactures in exchange, we have no reason to complain. Still, however, we ought surely not to neglect the cultivation of what is of so much importance to our existence as a nation, for it may often be impossible in time of war to obtain timber from foreign countries.

In the beginning of this article we mentioned the general division of trees into timber or forest-trees and fruit trees. We have already said all that our limits will permit respecting the former: we will now, therefore, say something of the latter. Our observations shall be confined to the methods of preserving fruit trees in blossom from the effects of frost, and from other diseases to which they are liable.

European
Magazine,
March
1791.

The chevalier de Bienenberg of Prague, we are told, has discovered a method of effectually preserving trees in blossom from the fatal effects of those frosts which sometimes in the spring destroy the most promising hopes of a plentiful crop of fruit. His method is extremely simple. He surrounds the trunk of the tree in blossom with a wisp of straw or hemp. The end of this he sinks, by means of a stone tied to it, in a vessel of spring water, at a little distance from the tree. One vessel will conveniently serve two trees; or the cord may be lengthened so as to surround several, before its end is plunged into the water. It is necessary that the vessel be placed in an open situation, and by no means shaded by the branches of the neighbouring trees, that the frost may produce all its effect on the water, by means of the cord communicating with it.—This precaution is particularly necessary for those trees the flowers of which appear nearly at the same time as the leaves; which trees are peculiarly exposed to the ravages of the frost. The proofs of its efficacy, which he had an opportunity of observing in the spring of 1787, were remarkably striking. Seven apricot espaliers in his garden began to blossom in the month of March. Fearing that they would suffer from the late frosts, he surrounded them with cords as above directed. In effect, pretty sharp frosts took place six or eight nights: the apricot-trees in the neighbouring gardens were all frozen, and none of them produced any fruit, whilst each of the chevalier's produced fruit in abundance, which came to the greatest perfection.

The following is the method proposed by Mr William Forsyth for curing injuries and defects in trees; for which a reward was given to him by his majesty, on condition that he should make it public. It is equally applicable to forest as to fruit trees (B).

Take one bushel of fresh cow-dung, half a bushel of lime rubbish of old buildings (that from the ceilings of rooms is preferable); half a bushel of wood-ashes; and a sixteenth part of a bushel of pit or river sand. The three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, un-

til the stuff is very smooth, like fine plaster used for the ceilings of rooms. The composition being thus made, care must be taken to prepare the tree properly for its application by cutting away all the dead, decayed, and injured parts, till you come to the fresh sound wood, leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw-knife, or other instrument, perfectly smooth, which must be particularly attended to. Then lay on the plaster about one-eighth of an inch thick all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible. Then take a quantity of dry powder of wood-ashes, mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box, with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder, till the whole plaster becomes a dry smooth surface.

All trees cut down near the ground should have the surface made quite smooth, rounding it off in a small degree, as before mentioned; and the dry powder directed to be used afterwards should have an equal quantity of powder of alabaster mixed with it, in order the better to resist the dripping of trees and heavy rains. If any of the composition be left for a future occasion, it should be kept in a tub or other vessel, and urine of any kind poured on it, so as to cover the surface; otherwise the atmosphere will greatly hurt the efficacy of the application. Where lime-rubbish of old buildings cannot be easily got, take powdered chalk, or common lime, after having been slaked a month at least. As the growth of the tree will gradually affect the plaster, by raising up its edges next the bark, care should be taken, where that happens, to rub it over with the finger when occasion may require (which is best done when moistened by rain), that the plaster may be kept whole, to prevent the air and wet from penetrating into the wound.

By this process, some old worn-out pear trees, that bore only a few small, hard fruit, of a kernelly texture, were made to produce pears of the best quality and finest flavour the second summer after the operation; and in four or five years they bore such plenteous crops, as a young healthy tree would not have produced in four times that period.

By this process, too, some large ancient elms, in a most decayed state, having all their upper parts broken, and a small portion only of the bark remaining, shot out stems from their tops, above thirty feet in height, in six or seven years from the first application of the composition.

Thus may valuable fruits be renovated; and forest trees, which are useful or ornamental from their particular situation, be preserved in a flourishing state. But what is far more interesting, a perfect cure has been made, and sound timber produced, in oak trees, which had received very considerable damage from blows, bruises, cutting of deep letters, the rubbing off the bark by the ends of rollers, or wheels of carts, or from the breaking of branches by storms.

TREFOIL, in botany. See TRIFOLIUM.

TREMELLA, in botany; a genus of plants belonging to the class of *cryptogamia*, and natural order of *alga*. It

Tree
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Tremella.

(B) A paste for covering the wounds of trees, and the place where grafts are inserted, was discovered long ago. It is recommended in a Treatise on Fruit Trees, published by Thomas Hitt in 1755; a third edition of which, with additions, was published in 1768. It consists of a mixture of clay and cows dung diluted with water. This paste he directs to be laid on the wound with a brush; it adheres firmly, he says, without cracking till the wound heals. We are informed by a gentleman, to whose opinion and experience we pay great respect, that this paste answers every purpose which Mr Forsyth's can serve.

Tremellius is a gelatinous membranous substance; the parts of the fructification scarcely visible. There are 11 species; of which five are indigenous; the *nostoc*, *lichenoides*, *verrucosa*, *hemispherica*, and *purpurea*.

1. The *nostoc*, or jelly rain tremella, is found in pastures and by the sides of gravel-walks in gardens after rains; not uncommon in spring, summer, and autumn. It is a membranaceous, pellucid, and gelatinous substance, without any visible root; of a yellowish dull green colour; assuming various forms, either round, angular, plaited or folded together irregularly, like the intestines, or a pocket-handkerchief, an inch or two or more in diameter: soft to the touch when moist; but thin, membranaceous, and brittle, when dry; and of a black fuscous colour.—The ancient alchemists called this vegetable *the flowers of heaven*, and imagined that from it they would procure the universal menstruum: but all their researches ended in discovering that by distillation it yielded some phlegm, volatile salt, and empyreumatic oil. It has been extolled in wounds, ulcers, &c. but no regard is ever paid to it by judicious practitioners. Dr Darwin says, he has been well informed that this tremella is a mucilage voided by herons after they have eaten frogs!! 2. The *lichenoides*, or transparent tremella, is erect, plane, margin curled, lacinulated, and brown. It grows on heaths and in woods, &c. 3. *Verrucosa*, or warty tremella, is tubercular, solid, wrinkled, roundish, and resembling a bladder; it is of a blackish yellow. It grows on stones in rivulets. 4. *Hemispherica*, or sea tremella, is scattered among conservæ, luci, &c. 5. *Purpurea*, or purple tremella, is globular, sessile, solitary, and smooth. It grows on ditch-banks about London.

TREMELLIUS (Emmanuel), a Jew by birth, was born at Ferrara in the year 1510. He was so carefully educated as to become a great master of the Hebrew tongue: he was converted to Christianity by the celebrated Peter Martyr. After travelling to Germany and England, he was made professor of Hebrew, first at Heidelberg, and then at Sedan, where he died in 1580. He translated the Hebrew Bible and Syriac Testament into Latin; in the former he was assisted by Junius, who afterwards corrected the second edition in 1587. This work was received by the Protestant churches with great approbation.

TREMOR, an involuntary shaking, chiefly of the hands and head, sometimes of the feet, and sometimes of the tongue and heart.—Tremors arising from a too free use of spirituous liquors require the same treatment as palsies.

TRENCHES, in fortification, are ditches cut by the besiegers, that they may approach the more securely to the place attacked; whence they are also called *lines of approach*.

TRENT (bishopric of), a province of Germany, in the circle of Austria, near the frontiers of Italy, is bounded on the north by Tirol; on the east, by the Feltrino and Bellunese; on the south, by Vicentino, the Veronese, Bresciano, and the lake de Garda; and on the west, by the Bresciano and the lake de Garda. The soil is said to be pretty fruitful, and to abound in wine and oil.

TRENT, a city of Germany, and capital of the bishopric of that name, is a very ancient place, and stands in a fertile and pleasant plain, in the midst of the high mountains of the Alps. The river Adige washes its walls, and creeping for some time among the hills, runs swiftly into Italy. Trent has three considerable churches, the principal of which is the cathedral: this is a very regular piece of architecture. The church of St Maria Major is all of red and white marble; and is remarkable for being the place where the famous council of Trent was held, whose decisions are now the

standing rule of the Romish church. E. Long. 11. 5. N. Lat. 46. 10.

TRENT, one of the largest rivers in England, which rises in the Moorland of Staffordshire, and runs south-west by Newcastle-under-Line; and afterwards dividing the county in two parts, runs to Burton, then to Nottingham and Newark; and so continuing its course due north to Gainfborough on the confines of Lincolnshire, it joins several rivers, and falls into the Humber.

TRENT (council of), in ecclesiastical history, denotes the council assembled by Paul III. in 1545, and continued by 25 sessions till the year 1563, under Julius III. and Pius IV. in order to correct, illustrate, and fix with perspicuity, the doctrine of the church, to restore the vigour of its discipline, and to reform the lives of its ministers. The decrees of this council, together with the creed of pope Pius IV. contain a summary of the doctrines of the Roman Catholics. These decrees were subscribed by 255 clergy, consisting of 4 legates, 2 other cardinals, 3 patriarchs, 25 archbishops, 168 bishops, besides inferior clergy. Of these 150 came from Italy; of course the council was entirely under the influence of the pope. For a more particular account of the council of Trent, see *Mosheim's Church History*, the *Modern Universal History*, Vol. XXIII. and *Father Paul's History of the Council of Trent*.

TRENTON. See *NEW JERSEY*.

TREPANNING. See *SURGERY*, n° 186.

TRES TABERNÆ (anc. geog.), a place in Latium, lying on the Via Appia, on the left or south side of the river Astura, to the north of the Paludes Pomptinæ. Its ruins are now seen near Cisterna, a village in the Compagna di Roma, 21 miles from Rome, whence the Christians went out to meet St Paul.

TRESPASS, in law, signifies any transgression of the law, under treason, felony, or misprision of either: but it is commonly used for any wrong or damage that is done by one private person to another, or to the king in his forest.

TRESSLE-TREES, in ship-building, two strong bars of timber fixed horizontally on the opposite sides of the lower mast-head, to support the frame of the top and the weight of the top-mast.

TRESSURE, in heraldry, a diminutive of an orle, usually held to be half the breadth thereof.

TRET, in commerce, an allowance made for the waste or the dirt that may be mixed with any commodity; which is commonly four pounds in every 104 pounds weight.

TREVERI, or TREVIRI (anc. geog.), an ancient and a powerful people both in horse and foot, according to Cæsar; extending far and wide between the Meuse and the Rhine. Their chief town was called *Treveris*. Now *Triers* or *Treves*.

TREVES, or TRIERS (in Latin *Trevere*, *Trevers*, *Treviris*, or *Augusta Trevirorum*), the capital of a German archbishopric of the same name, stands 60 miles west of Mentz, 52 south of Cologne, and 82 north of Strasburg. This city vies with most in Europe for antiquity, having been a large and noted town before Augustus settled a colony in it. It was free and imperial till the year 1560, when it was surprised and subjected by its archbishop James III. It stands on the Moselle, over which it has a fair stone bridge. The cathedral is a large building; and near it stands the elector's palace, which not long ago was rebuilt. Here are three collegiate and five parish churches, three colleges of Jesuits, thirteen monasteries and nunneries, an university founded in 1472, a house of the Teutonic order, and another of that of Malta, with some remains of the ancient Roman theatre. Roman coins and medals are often found in

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the ruins of the old city. In the cathedral they pretend to have our Saviour's coat and St Peter's staff, to which they ascribe miracles. The private houses here are mean; and the city is neither well fortified nor inhabited. E. Long. 6. 41. N. Lat. 49. 45.

TRIAL, in law, the examination of a cause according to the laws of the land before a proper judge; or it is the manner and order observed in the hearing and determining of causes.

Trials are either civil or criminal.

I. *Civil TRIALS.* The species of trials in civil cases are seven: By *record*; by *inspection*, or examination; by *certificate*; by *witnesses*; by *wager of battle*; by *wager of law*; and by *jury*. The first six are only had in certain special or eccentric cases, where the trial by jury would not be so proper or effectual: (See them explained under their respective titles). The nature of the last, that principal criterion of truth in the law of England, shall be explained in this article.

As trial by jury is esteemed one of the most important privileges which members of society can enjoy, and the bulwark of the British constitution, every man of reflection must be stimulated by the desire of inquiring into its origin and history, as well as to be acquainted with the forms and advantages by which it is accompanied. We will therefore begin with tracing it to its origin. Its institution has been ascribed to our Saxon ancestors by Sir William Blackstone.

Blackstone's
Commentaries,
vol. iii.
p. 349.

"Some authors (says that illustrious lawyer) have endeavoured to trace the original of juries up as high as the Britons themselves, the first inhabitants of our island; but certain it is, that they were in use among the earliest Saxon colonies, their institution being ascribed by bishop Nicholson to Woden himself, their great legislator and captain. Hence it is, that we may find traces of juries in the laws of all those nations which adopted the feudal system, as in Germany, France, and Italy; who had all of them a tribunal composed of twelve good men and true, *boni homines*, usually the vassals or tenants of the lord, being the equals or peers of the parties litigant; and, as the lord's vassals judged each other in the lord's courts, so the king's vassals, or the lords themselves, judged each other in the king's court. In England we find actual mention of them so early as the laws of king Ethelred, and that not as a new invention. Stierhook ascribes the invention of the jury, which in the Teutonic language is denominated *nembda*, to Regner king of Sweden and Denmark, who was contemporary with our king Egbert. Just as we are apt to impute the invention of this, and some other pieces of juridical polity, to the superior genius of Alfred the Great; to whom, on account of his having done much, it is usual to attribute every thing: and as the tradition of ancient Greece placed to the account of their own Hercules whatever achievement was performed superior to the ordinary prowess of mankind. Whereas the truth seems to be, that this tribunal was universally established among all the northern nations, and so interwoven in their very constitution, that the earliest accounts of the one give us also some traces of the other."

This opinion has been controverted with much learning and ingenuity by Dr Pettingal in his Enquiry into the Use and Practice of Juries among the Greeks and Romans, who deduces the origin of juries from these ancient nations.

He begins with determining the meaning of the word *δικασται* in the Greek, and *judices* in the Roman, writers. "The common acceptation of these words (says he), and the idea generally annexed to them, is that of *presidents of courts*, or, as we call them, *judges*; as such they are understood by commentators, and rendered by critics. Dr Middleton, in his life of Cicero, expressly calls the *judices*, *judges of the*

bench: and Archbishop Potter, and in short all modern writers upon the Greek or Roman orators, or authors in general, express *δικασται* and *judices* by such terms as convey the idea of *presidents in courts of justice*. The propriety of this is doubted of, and hath given occasion for this inquiry; in which is shown, from the best Greek and Roman authorities, that neither the *δικασται* of the Greeks, or the *judices* of the Romans, ever signified *presidents in courts of judicature*, or *judges of the bench*; but, on the contrary, they were distinguished from each other, and the difference of their duty and function was carefully and clearly pointed out by the orators in their pleadings, who were the best authorities in those cases, where the question related to forms of law, and methods of proceeding in judicial affairs and criminal process.

The presidents of the courts in criminal trials at Athens were the nine archons, or chief magistrates, of which whoever presided was called *πρῶτος δικαστης*, or president of the court. These nine presided in different causes peculiar to each jurisdiction. The archon, properly so called, had belonging to his department all pupillary and heritable cases; the *βασιλευς* or *rex sacrorum*, the chief priest, all cases where religion was concerned; the polemarchus, or general, the affairs of the army and all military matters; and the six, the *σμοθηται*, the other ordinary suits.

Wherever then the *αἰδεις δικασται*, or judicial men, are addressed by the Greek orators in their speeches, they are not to be understood to be the presiding magistrates, but another class of men, who were to inquire into the state of the cause before them, by witnesses and other methods of coming at truth; and after inquiry made and witnesses heard, to report their opinion and verdict to the president, who was to declare it.

The several steps and circumstances attending this judicial proceeding are so similar to the forms observed by our jury, that the learned reader, for such I must suppose him, cannot doubt but that the nature, intent, and proceedings of the *δικασται* among the Greeks were the same with the English jury; namely, for the protection of the lower people from the power and oppression of the great, by administering equal law and justice to all ranks; and therefore when the Greek orators directed their speeches to the *αἰδεις δικασται*, as we see in Demosthenes, Æschines, and Lyſias, we are to understand it in the same sense as when our lawyers at the bar say, *Gentlemen of the jury*.

So likewise among the Romans, the *judices*, in their pleadings at the bar, never signified judges of the bench, or presidents of the court, but a body or order of men, whose office in the courts of judicature was distinct from that of the prætor or *judex questionis*, which answered to our judge of the bench, and was the same with the archon, or *πρῶτος δικαστης*, of the Greeks: whereas the duty of the *judices* consisted in being impannelled, as we call it, challenged, and swore to try uprightly the case before them; and when they had agreed upon their opinion or verdict, to deliver it to the president who was to pronounce it. This kind of judicial process was first introduced into the Athenian polity by Solon, and thence copied into the Roman republic, as probable means of procuring just judgment, and protecting the lower people from the oppression or arbitrary decisions of their superiors.

When the Romans were settled in Britain as a province, they carried with them their *jura* and *instituta*, their laws and customs, which was a practice essential to all colonies; hence the Britons, and other countries of Germany and Gaul, learned from them the Roman laws and customs; and upon the irruption of the northern nations into the southern kingdoms of Europe, the laws and institutions of the Romans remained, when the power that introduced them was with-

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withdrawn: and Montesquieu tells us, that under the first race of kings in France, about the fifth century, the Romans that remained, and the Burgundians their new masters, lived together under the same Roman laws and police, and particularly the same forms of judicature. How reasonable then is it to conclude, that in the Roman courts of judicature continued among the Burgundians, the form of a jury remained in the same state it was used at Rome. It is certain, Montesquieu, speaking of those times, mentions the *paires* or *hommes de fief*, homagers or peers, which in the same chapter he calls *juges*, judges or jurymen: so that we hence see how at that time the *hommes de fief*, or "men of the fief," were called *peers*, and those peers were *juges* or jurymen. These were the same as are called in the laws of the confessor *pers de la tenure*, the "peers of the tenure, or homagers," out of whom the jury of peers were chosen, to try a matter in dispute between the lord and his tenant, or any other point of controversy in the manor. So likewise in all other parts of Europe, where the Roman colonies had been, the Goths succeeding them, continued to make use of the same laws and institutions, which they found to be established there by the first conquerors. This is a much more natural way of accounting for the origin of a jury in Europe, than having recourse to the fabelous story of Woden and his savage Scythian companions, as the first introducers of so humane and beneficent an institution."

Trials by jury in civil causes are of two kinds; *extraordinary* and *ordinary*.

1. The first species of *extraordinary* trial by jury is that of the grand assize, which was instituted by king Henry II. in parliament, by way of alternative offered to the choice of the tenant or defendant in a writ of right, instead of the barbarous and unchristian custom of duelling. For this purpose a writ *de magna assisa eligenda* is directed to the sheriff, to return four knights, who are to elect and choose 12 others to be joined with them; and these all together form the grand assize, or great jury, which is to try the matter of right, and must now consist of 16 jurors. Another species of extraordinary juries is the jury to try an attain; which is a process commenced against a former jury for bringing a false verdict. See the article *ATTAIN*.

2. With regard to the *ordinary* trial by jury in civil cases, the most clear and perspicuous way of treating it will be by following the order and course of the proceedings themselves.

When therefore an issue is joined by these words, "And this the said A prays may be inquired of by the country;" or, "And of this he puts himself upon the country, and the said B does the like;" the court awards a writ of *venire facias* upon the roll or record, commanding the sheriff "that he cause to come here, on such a day, twelve free and lawful men, *liberes et legales homines*, of the body of his county, by whom the truth of the matter may be better known, and who are neither of kin to the aforesaid A nor the aforesaid B, to recognize the truth of the issue between the said parties." And such writ is accordingly issued to the sheriff. It is made returnable on the last return of the same term wherein issue is joined, *viz.* hilary or trinity terms; which, from the making up of the issues therein, are usually called *issuable terms*. And he returns the names of the jurors in a panel (a little pane or oblong piece of parchment) annexed to the writ. This jury is not summoned, and therefore not appearing at the day must unavoidably make default. For which reason a compulsive process is now awarded against the jurors, called in the common pleas a writ of *habeas corpora juratorum*, and in the King's Bench *disfringas*, commanding the sheriff to have their bodies, or to distrain them by their lands and goods, that they may

appear upon the day appointed. The entry therefore on the roll of record is, "That the jury is respited, through defect of the jurors, till the first day of the next term, then to appear at Westminster; unless before that time, *viz.* on Wednesday the fourth of March, the justices of our lord the king appointed to take assizes in that county shall have come to Oxford, that is, to the place assigned for holding the assizes. Therefore the sheriff is commanded to have their bodies at Westminster on the said first day of next term, or before the said justices of assize, if before that time they come to Oxford, *viz.* on the fourth of March aforesaid." And as the judges are sure to come and open the circuit-commissions on the day mentioned in the writ, the sheriff returns and summons this jury to appear at the assizes; and there the trial is had before the justices of assize and *nisi prius*: among whom (as hath been said*) are usually two of the judges of the courts at Westminster, the whole kingdom being divided into six circuits for this purpose. And thus we may observe, that the trial of common issues, at *nisi prius*, was in its original only a collateral incident to the original business of the justices of assize; though now, by the various revolutions of practice, it is become their principal civil employment; hardly any thing remaining in use of the real assizes but the name.

If the sheriff be not an indifferent person, as if he be a party in the suit, or be related by either blood or affinity to either of the parties, he is not then trusted to return the jury; but the *venire* shall be directed to the coroners, who in this, as in many other instances, are the substitutes of the sheriff to execute process when he is deemed an improper person. If any exception lies to the coroners, the *venire* shall be directed to two clerks of the court, or two persons of the county named by the court, and sworn. And these two, who are called *electors*, or *electors*, shall indifferently name the jury, and their return is final; no challenge being allowed to their array.

Let us now pause a while, and observe (with Sir Matthew Hale*), in these first preparatory stages of the trial, how admirably this constitution is adapted and framed for the investigation of truth beyond any other method of trial in the world. For, first, the person returning the jurors is a man of some fortune and consequence; that so he may be not only the less tempted to commit wilful errors, but likewise be responsible for the faults of either himself or his officers: and he is also bound by the obligation of an oath faithfully to execute his duty. Next, as to the time of their return: the panel is returned to the court upon the original *venire*, and the jurors are to be summoned and brought in many weeks afterwards to the trial, whereby the parties may have notice of the jurors, and of their sufficiency or insufficiency, characters, connections, and relations, that so they may be challenged upon just cause; while, at the same time, by means of the compulsory process (of *disfringas*, or *habeas corpora*) the cause is not like to be retarded through defect of jurors. Thirdly, as to the place of their appearance: which in causes of weight and consequence is at the bar of the court; but in ordinary cases at the assizes, held in the county where the cause of action arises, and the witnesses and jurors live: a provision most excellently calculated for the saving of expence to the parties. For though the preparation of the causes in point of pleading is transacted at Westminster, whereby the order and uniformity of proceeding is preserved throughout the kingdom, and multiplicity of forms is prevented; yet this is no great charge or trouble, one attorney being able to transact the business of 40 clients. But the troublesome and most expensive attendance is that of jurors and witnesses at the trial; which therefore is brought home to them, in the county

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* See the article *Assize*.

Blackstone's Commentaries.

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county where most of them inhabit. Fourthly, the persons before whom they are to appear, and before whom the trial is to be held, are the judges of the superior court, if it be a trial at bar; or the judges of assize, delegated from the courts at Westminster by the king, if the trial be held in the country: persons, whose learning and dignity secure their jurisdiction from contempt, and the novelty and very parade of whose appearance have no small influence upon the multitude. The very point of their being strangers in the county is of infinite service, in preventing those factions and parties which would intrude in every cause of moment, were it tried only before persons resident on the spot, as justices of the peace, and the like. And the better to remove all suspicion of partiality, it was wisely provided by the statutes 4 Edw. III. c. 2. 8 Ric. II. c. 2. and 33 Hen. VIII. c. 24. that no judge of assize should hold pleas in any county wherein he was born or inhabits. And as this constitution prevents party and faction from intermingling in the trial of right, so it keeps both the rule and the administration of the laws uniform. These justices, though thus varied and shifted at every assizes, are all sworn to the same laws, have had the same education, have pursued the same studies, converse and consult together, communicate their decisions and resolutions, and preside in those courts which are mutually connected, and their judgments blended together, as they are interchangeably courts of appeal or advice to each other. And hence their administration of justice, and conduct of trials, are consonant and uniform; whereby that confusion and contrariety are avoided, which would naturally arise from a variety of uncommunicating judges, or from any provincial establishment. But let us now return to the assizes.

When the general day of trial is fixed, the plaintiff or his attorney must bring down the record to the assizes, and enter it with the proper officer, in order to its being called on in course.

These steps being taken, and the cause called on in court, the record is then handed to the judge, to peruse and observe the pleadings, and what issues the parties are to maintain and prove, while the jury is called and sworn. To this end the sheriff returns his compulsive process, the writ of *habeas corpora*, or *disfringas*, with the panel of jurors annexed, to the judge's officer in court.

The jurors contained in the panel are either special or common jurors. Special juries were originally introduced in trials at bar, when the causes were of too great nicety for the discussion of ordinary freeholders; or where the sheriff was suspected of partiality, though not upon such apparent cause as to warrant an exception to him. He is in such cases, upon motion in court, and a rule granted thereupon, to attend the prothonotary or other proper officer with his freeholder's book; and the officer is to take indifferently 48 of the principal freeholders, in the presence of the attorneys on both sides: who are each of them to strike off 12, and the remaining 24 are returned upon the panel. By the statute 3 Geo. II. c. 25. either party is entitled upon motion to have a special jury struck upon the trial of any issue, as well at the assizes as at bar, he paying the extraordinary expence, unless the judge will certify (in pursuance of the statute 24 Geo. II. c. 18.) that the cause required such special jury.

A common jury is one returned by the sheriff according to the directions of the statute 3 Geo. II. c. 25. which appoints, that the sheriff or officer shall not return a separate panel for every separate cause, as formerly; but one and the same panel for every cause to be tried at the same assizes, containing not less than 48, nor more than 72, jurors: and that their names being written on tickets, shall be put into

a box of glass; and when each cause is called, 12 of these persons, whose names shall be first drawn out of the box, shall be sworn upon the jury, unless absent, challenged, or excused; or unless a previous view of the messuages, lands, or place in question, shall have been thought necessary by the court; in which case, six or more of the jurors returned, to be agreed on by the parties, or named by a judge or other proper officer of the court, shall be appointed by special writ of *habeas corpora* or *disfringas*, to have the matters in question shown to them by two persons named in the writ; and then such of the jury as have had the view, or so many of them as appear, shall be sworn on the inquest previous to any other jurors. These acts are well calculated to restrain any suspicion of partiality in the sheriff, or any tampering with the jurors when returned.

As the jurors appear when called, they shall be sworn, unless challenged by either party. See the article CHALLENGE.

If by means of challenges or other cause, a sufficient number of unexceptionable jurors doth not appear at the trial, either party may pray a *tales*.

A *tales* is a supply of such men as are summoned upon the first panel, in order to make up the deficiency. For this purpose a writ of *decem tales*, *octo tales*, and the like, was wont to be issued to the sheriff at common law, and must be still so done at a trial at bar, if the jurors make default. But at the assizes, or *nisi prius*, by virtue of the statute 35 Hen. VIII. c. 6. and other subsequent statutes, the judge is empowered at the prayer of either party to award a *tales de circumstantibus* of persons present in court, to be joined to the other jurors to try the cause; who are liable, however, to the same challenges as the principal jurors. This is usually done till the legal number of 12 be completed; in which patriarchal and apostolical number Sir Edward Coke hath discovered abundance of mystery.

When a sufficient number of persons impanelled, or talesmen appear, they are then separately sworn, well and truly to try the issue between the parties, and a true verdict to give according to the evidence; and hence they are denominated "the jury," *jurata*, and "jurors," *sc. juratores*.

The jury are now ready to hear the merits; and to fix their attention the closer to the facts which they are impanelled and sworn to try, the pleadings are opened to them by counsel on that side which holds the affirmative of the question in issue. For the issue is said to lie, and proof is always first required upon that side which affirms the matter in question: in which our law agrees with the civil, *ei incumbit probatio qui dicit, non qui negat; cum per rerum naturam factum-negantis probatio nulla sit*. The opening counsel briefly informs them what has been transacted in the court above; the parties, the nature of the action, the declaration, the plea, replication, and other proceedings; and lastly, upon what point the issue is joined, which is there sent down to be determined. Instead of which, formerly the whole record and process of the pleadings were read to them in English by the court, and the matter of issue clearly explained to their capacities. The nature of the case, and the evidence intended to be produced, are next laid before them by counsel also on the same side; and when their evidence is gone through, the advocate on the other side opens the adverse case, and supports it by evidence; and then the party which began is heard by way of reply. See PLEADINGS.

Evidence in the trial by jury is of two kinds; either that which is given in proof, or that which the jury may receive by their own private knowledge. The former, or *proofs*, (to which in common speech the name of evidence is usually confined) are either written or parol; that is, by word of mouth.

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mouth. Written proofs, or evidence, are, 1. Records; and 2. Ancient deeds of 30 years standing, which prove themselves; but, 3. Modern deeds; and, 4. Other writings, must be attested and verified by parol evidence of witnesses. With regard to parol evidence or witnesses; it must first be remembered, that there is a process to bring them in by writ of *subpoena ad testificandum*; which commands them, laying aside all pretences and excuses, to appear at the trial on pain of 100 l. to be forfeited to the king; to which the statute 5 Eliz. c. 9. has added a penalty of 10 l. to the party aggrieved, and damages equivalent to the loss sustained by want of his evidence. But no witness, unless his reasonable expences be tendered him, is bound to appear at all; nor, if he appears, is he bound to give evidence till such charges are actually paid him; except he resides within the bills of mortality, and is summoned to give evidence within the same. This compulsory process, to bring in unwilling witnesses, and the additional terrors of an attachment in case of disobedience, are of excellent use in the thorough investigation of truth: and, upon the same principle, in the Athenian courts, the witnesses who were summoned to attend the trial had their choice of three things: either to swear to the truth of the fact in question, to deny or abjure it, or else to pay a fine of 1000 drachmas.

All witnesses, of whatever religion or country, that have the use of their reason, are to be received and examined, except such as are infamous, or such as are interested in the event of the cause. All others are competent witnesses; though the jury from other circumstances will judge of their credibility. Infamous persons are such as may be challenged as jurors, *propter delictum*: and therefore never shall be admitted to give evidence to inform that jury, with whom they were too scandalous to associate. Interested witnesses may be examined upon a *voir dire*, if suspected to be secretly concerned in the event; or their interest may be proved in court. Which last is the only method of supporting an objection to the former class; for no man is to be examined to prove his own infamy. And no counsel, attorney, or other person, intrusted with the secrets of the cause by the party himself, shall be compelled, or perhaps allowed, to give evidence of such conversation or matters of privacy as came to his knowledge by virtue of such trust and confidence: but he may be examined as to mere matters of fact, as the execution of a deed or the like, which might have come to his knowledge without being intrusted in the cause.

One witness (if credible) is sufficient evidence to a jury of any single fact: though undoubtedly the concurrence of two or more corroborates the proof. Yet our law considers that there are many transactions to which only one person is privy; and therefore does not always demand the testimony of two. Positive proof is always required, where, from the nature of the case, it appears it might possibly have been had. But, next to positive proof, circumstantial evidence, or the doctrine of presumptions, must take place: for when the fact itself cannot be demonstratively evinced, that which comes nearest to the proof of the fact is the proof of such circumstances which either necessarily or usually attend such facts; and these are called *presumptions*, which are only to be relied upon till the contrary be actually proved.

The oath administered to the witness is not only that what he deposes shall be true, but that he shall also depose the whole truth: so that he is not to conceal any part of what he knows, whether interrogated particularly to that point or not. And all this evidence is to be given in open court, in the presence of the parties, their attorneys, the counsel, and all bystanders; and before the judge and jury: each party having liberty to except to its competency,

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which exceptions are publicly stated, and by the judge are openly and publicly allowed or disallowed, in the face of the country: which must curb any secret bias or partiality that might arise in his own breast.

When the evidence is gone through on both sides, the judge, in the presence of the parties, the counsel, and all others, sums up the whole to the jury; omitting all superfluous circumstances, observing wherein the main question and principal issue lies, stating what evidence has been given to support it, with such remarks as he thinks necessary for their direction, and giving them his opinion in matters of law arising upon that evidence.

The jury, after the proofs are summed up, unless the case be very clear, withdraw from the bar to consider of their verdict; and in order to avoid intemperance and causeless delay, are to be kept without meat, drink, fire, or candle, unless by permission of the judge, till they are unanimously agreed. A method of accelerating unanimity not wholly unknown in other constitutions of Europe, and in matters of greater concern. For by the golden bull of the empire, if, after the congress is opened, the electors delay the election of a king of the Romans for 30 days, they shall be fed only with bread and water till the same is accomplished. But if our juries eat or drink at all, or have any eatables about them, without consent of the court, and before verdict, it is fineable; and if they do so at his charge for whom they afterwards find, it will set aside the verdict. Also, if they speak with either of the parties or their agents after they are gone from the bar, or if they receive any fresh evidence in private, or if, to prevent disputes, they cast lots for whom they shall find, any of these circumstances will entirely vitiate the verdict. And it has been held, that if the jurors do not agree in their verdict before the judges are about to leave the town, though they are not to be threatened or imprisoned, the judges are not bound to wait for them, but may carry them round the circuit from town to town in a cart. This necessity of a total unanimity seems to be peculiar to our own constitution; or at least, in the *nemda* or jury of the ancient Goths, there was required (even in criminal cases) only the consent of the major part; and in case of an equality, the defendant was held to be acquitted.

When they are all unanimously agreed, the jury return back to the bar; and before they deliver their verdict, the plaintiff is bound to appear in court, by himself, attorney, or counsel, in order to answer the amercement to which by the old law he is liable, in case he fails in his suit, as a punishment for his false claim. To be amerced, or a *mercie*, is to be at the king's mercy with regard to the fine to be imposed; in *miseriordia domini regis pro falso clamore suo*. The amercement is dispensed, but the form still continues; and if the plaintiff does not appear, no verdict can be given; but the plaintiff is said to be nonsuit, *non sequitur clamorem suum*. Therefore it is usual for a plaintiff, when he or his counsel perceives that he has not given evidence sufficient to maintain his issue, to be voluntarily nonsuited, or withdraw himself: whereupon the crier is ordered to call the plaintiff; and if neither he, nor any body for him, appears, he is nonsuited, the jurors are discharged, the action is at an end, and the defendant shall recover his costs. The reason of this practice is, that a nonsuit is more eligible for the plaintiff than a verdict against him: for after a nonsuit, which is only a default, he may commence the same suit again for the same cause of action; but after a verdict had, and judgment consequent thereupon, he is for ever barred from attacking the defendant upon the same ground of complaint. But in case the plaintiff appears, the jury by their foreman deliver in their verdict.

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A verdict, *vere dictum*, is either privy or public. A privy verdict is when the judge hath left or adjourned the court: and the jury, being agreed, in order to be delivered from their confinement, obtain leave to give their verdict privily to the judge out of court: which privy verdict is of no force, unless afterwards affirmed by a public verdict given openly in court; wherein the jury may, if they please, vary from their privy verdict. So that the privy verdict is indeed a mere nullity; and yet it is a dangerous practice, allowing time for the parties to tamper with the jury, and therefore very seldom indulged. But the only effectual and legal verdict is the public verdict: in which they openly declare to have found the issue for the plaintiff, or for the defendant; and if for the plaintiff, they assess the damages also sustained by the plaintiff, in consequence of the injury upon which the action is brought.

When the jury have delivered in their verdict, and it is recorded in court, they are then discharged; and so ends the trial by jury: a trial which ever has been, and it is hoped ever will be, looked upon as the glory of the English law. It is certainly the most transcendent privilege which any subject can enjoy or wish for, that he cannot be affected either in his property, his liberty, or his person, but by the unanimous consent of 12 of his neighbours and equals. A constitution that we may venture to affirm has, under providence, secured the just liberties of this nation for a long succession of ages. And therefore a celebrated French writer †, who concludes, that because Rome, Sparta, and Carthage, have lost their liberties, therefore those of England in time must perish, should have recollected, that Rome, Sparta, and Carthage, at the time when their liberties were lost, were strangers to the trial by jury.

Great as this eulogium may seem, it is no more than this admirable constitution, when traced to its principles, will be found in sober reason to deserve.

The impartial administration of justice, which secures both our persons and our properties, is the great end of civil society. But if that be entirely entrusted to the magistracy, a select body of men, and those generally selected by the prince or such as enjoy the highest offices in the state, their decisions, in spite of their own natural integrity, will have frequently an involuntary bias towards those of their own rank and dignity: it is not to be expected from human nature, that the few should be always attentive to the interests and good of the many. On the other hand, if the power of judicature were placed at random in the hands of the multitude, their decisions would be wild and capricious, and a new rule of action would be every day established in our courts. It is wisely therefore ordered, that the principles and axioms of law, which are general propositions flowing from abstracted reason, and not accommodated to times or to men, should be deposited in the breasts of the judges, to be occasionally applied to such facts as come properly ascertained before them. For here partiality can have little scope; the law is well known, and is the same for all ranks and degrees: it follows as a regular conclusion from the premises of fact pre-established. But in settling and adjusting a question of fact, when intrusted to any single magistrate, partiality and injustice have an ample field to range in, either by boldly asserting that to be proved which is not so, or more artfully by suppressing some circumstances, stretching and warping others, and distinguishing away the remainder. Here therefore a competent number of sensible and upright jurymen, chosen by lot from among those of the middle rank, will be found the best investigators of truth, and the surest guardians of public justice. For the most powerful individual in the state will be cautious of committing any flagrant invasion of another's right, when he knows that the

fact of his oppression must be examined and decided by 12 indifferent men not appointed till the hour of trial; and that when once the fact is ascertained, the law must of course redress it. This therefore preserves in the hands of the people that share which they ought to have in the administration of public justice, and prevents the encroachments of the more powerful and wealthy citizens.

Criminal TRIALS. The regular and ordinary method of proceeding in the courts of criminal jurisdiction may be distributed under 12 general heads, following each other in a progressive order: viz. 1. Arrest; 2. Commitment and bail; 3. Prosecution; 4. Process; 5. Arraignment, and its incidents; 6. Plea, and issue; 7. Trial, and conviction; 8. Clergy; 9. Judgment, and its consequences; 10. Reversal of judgment; 11. Reprieve, or pardon; 12. Execution. See ARREST, COMMITMENT, PRESENTMENT, INDICTMENT, INFORMATION, APPEAL, *PROCESS upon an Indictment*, ARRAIGNMENT, and PLEA; in which articles all the forms which precede the trial are described, and are here enumerated in the proper order.

The several methods of trial and conviction of offenders, established by the laws of England, were formerly more numerous than at present, through the superstition of our Saxon ancestors; who, like other northern nations, were extremely addicted to divination; a character which Tacitus observes of the ancient Germans. They therefore invented a considerable number of methods of purgation or trial, to preserve innocence from the danger of false witnesses, and in consequence of a notion that God would always interpose miraculously to vindicate the guiltless; as, 1. By ORDEAL; 2. By CORSDRED; 3. By BATTEL. See these articles.

4. A fourth method is that by the *peers of Great Britain*, in the *Court of PARLIAMENT*; or the *Court of the Lord High STEWARD*, when a peer is capitally indicted; for in case of an appeal, a peer shall be tried by jury. This differs little from the trial *per patriam*, or by jury; except that the peers need not all agree in their verdict; and except also, that no special verdict can be given in the trial of a peer; because the lords of parliament, or the lord high steward (if the trial be had in his court), are judges sufficiently competent of the law that may arise from the fact; but the greater number, consisting of 12 at the least, will conclude, and bind the minority.

The trial by jury, or the country, *per patriam*, is also that trial by the peers of every Briton, which, as the great bulwark of his liberties, is secured to him by the great charter: *nullus liber homo capitatur, vel imprisonetur, aut exulet, aut aliquo alio modo destruatur, nisi per legale iudicium parium suorum, vel per legem terra.*

When therefore a prisoner on his ARRAIGNMENT has pleaded not guilty, and for his trial hath put himself upon the country, which country the jury are, the sheriff of the county must return a panel of jurors, *liberos et legales homines, de vicineto*; that is, freeholders without just exception, and of the *visne* or neighbourhood; which is interpreted to be of the county where the fact is committed. If the proceedings are before the court of king's bench, there is time allowed between the arraignment and the trial, for a jury to be impanelled by writ of *venire facias* to the sheriff, as in civil causes; and the trial in case of a misdemeanor is had at *nisi prius*, unless it be of such consequence as to merit a trial at bar; which is always invariably had when the prisoner is tried for any capital offence. But, before commissioners of oyer and terminer and gaol-delivery, the sheriff, by virtue of a general precept directed to him beforehand, returns to the court a panel of 48 jurors, to try all felons that may be called upon their trial at that session; and therefore it is there usual to try all felons immediately or soon after their

Trial.

† *Montesquieu, Spir. L. xi. 9.*

Trial arraignment. But it is not customary, nor agreeable to the general course of proceedings, unless by consent of parties, to try persons indicted of smaller misdemeanors at the same court in which they have pleaded not guilty, or traversed the indictment. But they usually give security to the court to appear at the next assizes or session, and then and there to try the traverse, giving notice to the prosecutor of the same.

In cases of high-treason, whereby corruption of blood may ensue (except treason in counterfeiting the king's coin or seals), or misprision of such treason, it is enacted by statute 7 W. III. c. 3. first, that no person shall be tried for any such treason, except an attempt to assassinate the king, unless the indictment be found within three years after the offence committed: next, that the prisoner shall have a copy of the indictment (which includes the caption), but not the names of the witnesses, five days at least before the trial, that is, upon the true construction of the act, before his arraignment; for then is his time to take any exceptions thereto, by way of plea or demurrer: thirdly, that he shall also have a copy of the panel of jurors two days before his trial: and, lastly, that he shall have the same compulsive process to bring in his witnesses for him, as was usual to compel their appearance against him. And by statute 7 Ann. c. 21. (which did not take place till after the decease of the late pretender) all persons indicted for high-treason, or misprisions thereof, shall have not only a copy of the indictment, but a list of all the witnesses to be produced, and of the jurors impanelled, with their professions and places of abode, delivered to him ten days before the trial, and in the presence of two witnesses, the better to prepare him to make his challenges and defence. And no person indicted for felony is, or (as the law stands) ever can be, entitled to such copies before the time of his trial.

When the trial is called on, the jurors are to be sworn as they appear, to the number of 12, unless they are challenged by the party.

Challenges may here be made, either on the part of the king, or on that of the prisoner; and either to the whole array, or to the separate polls, for the very same reasons that they may be made in civil causes. But in criminal cases, or at least in capital ones, there is, *in favorem vite*, allowed to the prisoner an arbitrary and capricious species of challenge, to a certain number of jurors, without showing any cause at all; which is called a *peremptory* challenge; a provision full of that tenderness and humanity to prisoners for which our English laws are justly famous. This is grounded on two reasons. 1. As every one must be sensible what sudden impressions and unaccountable prejudices we are apt to conceive upon the bare looks and gestures of another; and how necessary it is that a prisoner (when put to defend his life) should have a good opinion of his jury, the want of which might totally disconcert him; the law wills not that he should be tried by any one man against whom he has conceived a prejudice, even without being able to assign a reason for such his dislike. 2. Because, upon challenges for cause shown, if the reason assigned prove insufficient to set aside the juror, perhaps the bare questioning his indifference may sometimes provoke a resentment; to prevent all ill consequences from which, the prisoner is still at liberty, if he pleases, peremptorily to set him aside.

The peremptory challenges of the prisoner must, however, have some reasonable boundary; otherwise he might never be tried. This reasonable boundary is settled by the common law to be the number of 35; that is, one under the number of three full juries.

If by reason of challenges or the default of the jurors, a

sufficient number cannot be had of the original panel, a tales may be awarded as in civil causes, till the number of 12 is sworn, "well and truly to try, and true deliverance make, between our sovereign lord the king and the prisoner whom they have in charge; and a true verdict to give, according to their evidence."

When the jury is sworn, if it be a cause of any consequence, the **INDICTMENT** is usually opened, and the evidence marshalled, examined, and enforced by the counsel for the crown or prosecution. But it is a settled rule at common law, that no counsel shall be allowed a prisoner upon his trial upon the general issue, in any capital crime, unless some point of law shall arise proper to be debated. A rule which (however it may be palliated under cover of that noble declaration of the law, when rightly understood, that the judge shall be counsel for the prisoner; that is, shall see that the proceedings against him are legal and strictly regular) seems to be not at all of a piece with the rest of the humane treatment of prisoners by the English law. For upon what face of reason can that assistance be denied to save the life of a man, which yet is allowed him in prosecutions for every petty trespass? Nor indeed is it, strictly speaking, a part of our ancient law; for the *Mirror*, having observed the necessity of counsel in civil suits, "who know how to forward and defend the cause by the rules of law, and customs of the realm," immediately afterwards subjoins, "and more necessary are they for defence upon indictments and appeals of felony, than upon other venial causes." And, to say the truth, the judges themselves are so sensible of this defect in our modern practice, that they seldom scruple to allow a prisoner counsel to stand by him at the bar, and to instruct him what questions to ask, or even to ask questions for him, with regard to matters of fact; for as to matters of law arising on the trial, they are entitled to the assistance of counsel. But still this is a matter of too much importance to be left to the good pleasure of any judge, and is worthy the interposition of the legislature; which has shown its inclination to indulge prisoners with this reasonable assistance, by enacting, in statute 7 W. III. c. 3. that persons indicted for such high-treason as works a corruption of the blood or misprision thereof (except treason in counterfeiting the king's coins or seals), may make their full defence by counsel, not exceeding two, to be named by the prisoner, and assigned by the court or judge; and this indulgence, by statute 20 Geo. II. c. 30. is extended to parliamentary impeachments for high-treason, which were excepted in the former act.

When the evidence on both sides is closed, the jury cannot be discharged (unless in cases of evident necessity) till they have given in their **VERDICT**. If they find the prisoner not guilty, he is then for ever quit and discharged of the accusation, except he be appealed of felony within the time limited by law. And upon such his acquittal, or discharge for want of prosecution, he shall be immediately set at large without payment of any fee to the gaoler. But if the jury find him guilty, he is then said to be convicted of the crime whereof he stands indicted. See the article **CONVICTION**; and, subsequent thereto, the articles **JUDGMENT**, **ATTAINDER**, **FORFEITURE**, **EXECUTION**, also *Benefit of CLERGY*, *REPRIEVE*, *PARDON*.

TRIAL, in Scotland. See *Scots LAW*.

TRIANDRIA (from τρεις "three," and ἀνρ "a man or husband"), the name of the third class in Linnæus's sexual system, consisting of plants with hermaphrodite flowers, which have three stamina or male organs.

TRIANGLE, in geometry, a figure of three sides and three angles.

Tribe
||
Trichecus

TRIBE, in antiquity, a certain quantity or number of persons, when a division was made of a city or people into quarters or districts.

TRIBRACHYS, in ancient poetry, a foot consisting of three syllables, and these all short; as, *melius*.

TRIBUNAL, in general, denotes the seat of a judge, called in our courts *bench*.

TRIBUNE, among the ancient Romans, a magistrate chosen out of the commons, to protect them against the oppressions of the great, and to defend the liberty of the people against the attempts of the senate and consuls.

The tribunes of the people were first established in the year of Rome 259. The first design of their creation was to shelter the people from the cruelty of usurers, and to engage them to quit the Aventine mount, whither they had retired in displeasure.

Their number at first was but two; but the next year, under the consulate of A. Posthumius Aruncius and Cassius Viscellinus, there were three more added; and this number of five was afterwards increased by L. Trebonius to ten.

Military TRIBUNE, an officer in the Roman army, commander in chief over a body of forces, particularly the division of a legion; much the same with our colonel, or the French *maitre de camp*.

TRIBUTARY, one who pays tribute to another, in order to live in peace with him or share in his protection.

TRIBUTE, a tax or impost which one prince or state is obliged to pay to another as a token of dependence, or in virtue of a treaty, and as a purchase of peace.

TRICEPS, in anatomy. See there, *Table of the MUSCLES*.

TRICHECUS, WALRUS; a genus of aquatic animals belonging to the class of *mammalia*, and order of *bruta*. This genus has no fore-teeth, when full grown: has two great tusks in the upper jaw, which point downwards: has grinders on each side in both jaws, which are composed of furrowed bones. The body is oblong; the lips are doubled; and the hind legs are stretched backwards, and, as it were, bound together, forming a kind of tail fitted for swimming. There are three species; the *rosmarus*, *dugon*, and *manatus*.

1. The *rosmarus*, morse, or sea-horse, has a round head; small mouth; very thick lips, covered above and below with pellucid bristles as thick as a straw; small fiery eyes; two small orifices instead of ears; short neck; body thick in the middle, tapering towards the tail; skin thick, wrinkled, with short brownish hairs thinly dispersed; legs short, five toes on each, all connected by webs, and small nails on each: the hind feet are very broad; each leg loosely articulated; the hind legs generally extended on a line with the body: the tail is very short; penis long: length of the animal from nose to tail sometimes 18 feet, and 10 or 12 round in the thickest part: the teeth have been sometimes found of the weight of 30 lb. each. Teeth of this size are only found on the coast of the Icy Sea, where the animals are seldom molested, and have time to attain their full growth. See Plate DX. fig. 1.

They inhabit the coast of Spitzbergen, Nova Zembla, Hudson's Bay, and the gulph of St Lawrence; and the Icy Sea, as far as Cape Tschuktschi. They are gregarious; in some places appearing in herds of hundreds. They are shy animals, and avoid places which are much haunted by mankind; but are very fierce. If wounded in the water, they attempt to sink the boat, either by rising under it, or by striking their great teeth into the sides; they roar very loud, and will follow the boat till it gets out of sight. Numbers of them are often seen sleeping on an island of ice; if

awaked, they fling themselves with great impetuosity into the sea; at which time it is dangerous to approach the ice, lest they should tumble into the boat and upset it. They do not go upon the land till the coast is clear of ice. At particular times they land in amazing numbers: the moment the first gets on shore, so as to lie dry, it will not stir till another comes and forces it forward by beating it with its great teeth; this is served in the same manner by the next; and so in succession till the whole is landed; continuing tumbling over one another, and forcing the foremost, for the sake of quiet, to remove farther up.

They are killed for the sake of their oil, one walrus producing about half a tun. The knowledge of this chase is of great antiquity; Oether the Norwegian, about the year 890, made a report of it to king Alfred, having, as he says, made the voyage beyond Norway, for the more commodious of fishing of horse-whales, which have in their teeth bones of great price and excellency, whereof he brought some at his return unto the king. In fact, it was in the northern world, in early times, the substitute to ivory, being very white and very hard. Their skins, Oether says, were good to cut into cables. M. de Buffon says, he has seen braces for coaches made of the skin, which were both strong and elastic.

They bring one, or at most two, young at a time: they feed on sea herbs and fish; also on shells, which they dig out of the sand with their teeth: they are said also to make use of their teeth to ascend rocks or pieces of ice, fastening them to the cracks, and drawing their bodies up by that means. Besides mankind, they seem to have no other enemy than the white bear, with whom they have terrible combats; but generally come off victorious, by means of their great teeth.

In Captain Cook's Voyages we have the following affecting account of their parental attachment to their young. "On the approach of the boats towards the ice, they took their young ones under their fins, and attempted to escape with them into the sea. Some, whose cubs were killed or wounded, and left floating upon the surface of the water, rose again, and carried them down, sometimes just as our men were on the point of taking them into the boat; and could be traced bearing them to a considerable distance through the water, which was stained with their blood. They were afterwards observed bringing them, at intervals, above the surface, as if for air, and again plunging under it, with a horrid bellowing. The female, in particular, whose young one had been killed, and taken into the boat, became so furious, that she even struck her two tusks through the bottom of the cutter."

2. The *dugon*, or Indian walrus, is distinguished by the tusks which extend out of the mouth from the upper jaw being placed near each other. It inhabits the seas lying between the Cape of Good Hope and the Philippine islands. This animal, so far as can be known, resembles the morse very much: the head is, however, more lengthened and narrower; the nostrils are large, and placed higher; like the former species, there are no tusks in the under jaw, but those in the upper jaw, as has been already observed, are placed near each other, bent outwards, and resemble cutting teeth, only that they are near six inches long; there are four grinders on each side in the upper jaw, and three in the lower; these last are distant from the tusks, and are broader than those of the morse: the female has two teats on the breast: the chin has a bristly beard; the ears are short; the feet broad; and the legs so short that the belly trails on the ground. When full grown, the animal is six ells in length; the male being rather larger than the female, which has breasts like a woman: It feeds on a green sea moss or weed, which grows near the shore. The figure, manners, and

Trichechus and history, of this animal, are very imperfectly known; but we are informed that its flesh eats like beef.

3. *Manatus*, fish-tailed walrus, or sea-cow, has no tusks, and no hind feet. Of this species there are two varieties; the australis or lamantin, and the borealis or whale-tailed manati. The lamantin inhabits the African and American seas, particularly near the mouths of rivers, which they frequently enter, seldom going far from the shore. The lamantin varies in size from eight to seventeen feet long, is six or seven in circumference, and from 500 to 800 pounds weight: the skin is of a dark or black ash colour; there are nine square shaped grinders on each side in each jaw, which are covered with a glassy crust of enamel; the back bone has 50 joints or vertebræ: it is a thick clumsy animal, having no properly distinct neck, as the body continues almost of an equal thickness to the head. The female has two teats placed near the arm-pits. This animal never comes on shore, but frequents the mouths of large rivers, browsing on the grass which grows close to the water. There seems to be two varieties, differing considerably in size. The larger frequents the seas near the mouths of large rivers; and the smaller is found higher up the same rivers, and in inland fresh water lakes, but never goes to the sea.

We are told that this animal is often tamed by the native inhabitants of America, and that it delights in music; hence, according to some authors, it is probably the delphinus or dolphin of the ancients: and some believe, that what has been written concerning mermaids and sirens must be referred to this animal. It has a voracious appetite, and is perpetually eating: it is monogamous, or lives in families of one male, one female, a half grown and a very small young one; copulates in the spring, the female at first flying in various playful circles, and then throwing herself on her back to receive the male: When pasturing on the aquatic plants, the back is often above water; and, as the skin is full of a species of louse, numbers of sea fowls perch on them, to pick out the insects. They bellow like bulls: their sight is very weak, but their hearing extremely acute; the fore-feet are palmated and fin-shaped, almost like those of a sea-turtle; and instead of hind-feet they have a horizontal tail; they have no external ears; the nostrils are distinct, and at a distance from each other; the females have two teats about the breast; the upper lip is full of sharp, prickly, rigid bristles. This animal has great affinity to the whale and seal tribes. The flesh is very good eating.

The whale-tailed manati inhabits the north-west coast of America, the north-east of Asia, and the islands which lie between these two coasts. This animal very often enters the mouths of the rivers; is sometimes 23 feet long, and weighs 8000 pounds; the skin, while wet, is of a brown colour, but becomes black when dry. Instead of grinders, this species has, on each side of each jaw, a large rugged bone. The back-bone has 60 vertebræ or joints: the body is very clumsy, and much deformed; its circumference at the shoulders is 12 feet, at the belly 20, and near the tail only four; the neck is near seven feet round, and the head only 31 inches.

They live perpetually in the water, and frequent the edges of the shores; and in calm weather swim in droves near the mouths of rivers: in the time of flood they come so near the land, that a person may stroke them with his hand: if hurt, they swim out to sea; but presently return again. The females oblige the young to swim before them, while the other old ones surround, and as it were guard them on all sides. The affection between the male and female is very great: for if she is attacked, he will defend her to the utmost; and if she is killed, will follow her corpse to the very shore, and swim for some days near

the place it has been landed at. They copulate in the spring, in the same manner as the human kind, especially in calm weather, towards the evening. The female swims gently about; the male pursues; till, tired with wantoning, she flings herself on her back, and admits his embraces. Steller thinks they go with young about a year; it is certain that they bring but one young at a time, which they suckle by two teats placed between the breast. They are vastly voracious and gluttonous; and feed not only on the fuci that grow in the sea, but such as are flung on the edges of the shore. When they are filled, they fall asleep on their backs. During their meals, they are so intent on their food, that any one may go among them and choose which he likes best. Peter Martyr gives an instance of one that lived in a lake of Hispaniola for 25 years, and was so tame as to come to the edge of the shore on being called; and would even perform the part of a ferry, and carry several people at a time on its back to the opposite shore.—Their back and their sides are generally above water.

They continue in the Kamtschatkan and American seas the whole year; but in winter are very lean, so that you may count their ribs. They are taken by harpoons fastened to a strong cord; and after they are struck, it requires the united force of 30 men to draw them on shore. Sometimes when they are transfixed, they will lay hold of the rocks with their paws, and stick so fast as to leave the skin behind before they can be forced off. When a manati is struck, its companions swim to its assistance; some will attempt to overturn the boat by getting under it; others will press down the rope, in order to break it; and others will strike at the harpoons with their tails, with a view of getting it out, in which they often succeed. They have not any voice; but make a noise by hard breathing like the snorting of a horse.

The skin is very thick, black, and full of inequalities, like the bark of oak, and so hard as scarce to be cut with an axe, and has no hair on it: beneath the hair is a thick blubber, which tastes like oil of almonds. The flesh is coarser than beef, and will not soon putrify. The young ones taste like veal. The skin is used for shoes, and for covering the sides of boats.

TRICHOMANES, in botany; a genus of plants belonging to the class of *cryptogamia*, and order of *filices*. The parts of fructification are solitary, and terminated by a style like a bristle, on the very edge of the leaf. There are 13 species; of which two are natives of Britain, the *pixidiferum* and *tunbrigense*.

1. *Pixidiferum*, or cup-trichomanes, has sub-bipinnated leaves, the pinnæ being alternate, close-lobed, and linear. It is found among stones in wet grounds in England. 2. *Tunbrigense*, or Tunbridge trichomanes, has pinnated leaves, the pinnæ being oblong, dichotomous, decurrent, and dentated. It is found in the fissures of moist rocks in Wales, and in many rocky places in Scotland.

TRICOCCEÆ (*τρεῖς* "three," and *κκκος* "a grain"), the name of the 38th order in Linnæus's *Fragments of a Natural Method*, consisting of plants with a single three-cornered capsule, having three cells, or internal divisions, each containing a single seed. See BOTANY, vol. iii. page 466.

TRICOSANTHES, in botany: A genus of plants belonging to the class of *monœcia*, and order of *syngenesia*; and in the natural system ranging under the 34th order, *Cucurbitaceæ*. There are four species; only one of which is cultivated in the British gardens, the *anguina* or snake-gourd, which is a native of China, an annual, and of the cucumber tribe.

TRIDENT, an attribute of Neptune, being a kind of sceptre which the painters and poets put into the hands of

Trichechus.

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Trident.

Triennial
Trifolium.

that god, in form of a spear or fork with three teeth; whence the word.

TRIENNIAL, an epithet applied chiefly to officers or employments which last for three years.

TRIENS, in antiquity, a copper money of the value of one third of an *as*, which on one side bore a Janus's head, and on the other a water rat.

TRIENTALIS, **CHICKWEED WINTER-GREEN**, in botany: A genus of plants belonging to the class of *heptandria*, and order of *monogynia*; and in the natural system ranging under the 20th order, *Rotaceæ*. The calyx is heptaphyllous; the corolla is equal and plane, and is divided into seven segments; the berry is unilocular and dry. There is only one species, the *europæa*; which is indigenous, and the only genus of heptandria that is so.

The stalk is single, five or six inches high, terminated with five, six, or seven, oval pointed leaves; from the centre of which arise on long footstalks commonly two white starry flowers, each generally consisting of seven oval and equal petals, succeeded by a globular dry berry, covered with a thin white rind, having one cell, and containing several angular seeds.

TRIERS, or **TREVES**. See **TREVES**.

TRIFOLIUM, **TREFOIL**, or *Clover*, in botany: A genus of plants belonging to the class of *diadelphia*, and order of *decandria*; and in the natural system ranging under the 32d order, *Papilionaceæ*. The flowers are generally in round heads; the pod is scarcely longer than the calyx, univalve, not opening, deciduous. The leaves are three together. According to Murray's edition of Linnæus, there are 46 species; of which 17 are natives of Britain. We shall describe some of the most remarkable of these:

1. *Meliloti officinalis*, or melilot, has naked racemous pods, dispermous, wrinkly, and acute, with an erect stalk. It grows in corn-fields and by the way-sides, but not common. The stalk is erect, firm, striated, branched, and two or three feet high: the leaves ternate, smooth, obtusely oval, and serrated: the flowers are small, yellow, pendulous, and grow in long close spikes at the tops of the branches: the pod is very short, turgid, transversely wrinkled, pendulous, and contains either one or two seeds. The plant has a very peculiar strong scent, and disagreeable, bitter, acrid taste, but such, however, as is not disagreeable to cattle. The flowers are sweet-scented. It has generally been esteemed emollient and digestive, and been used in fomentations and cataplasms, particularly in the plaster employed in dressing blisters; but is now laid aside, as its quality is found to be rather acrid and irritating than emollient or resolvent. It communicates a most loathsome flavour to wheat and other grain, so as to render it unfit for making bread. It grows in corn-fields.

2. *Trifolium repens*, white creeping trefoil, or Dutch clover, has a creeping stalk, its flower gathered into an umbellar head, and its pods tetraspermous. It is very common in fields and pastures. It is well known to be excellent fodder for cattle; and the leaves are a good rustic hygrometer, as they are always relaxed and flaccid in dry weather, but erect in moist or rainy.

3. *Trifolium pratense*, purple or red clover, is distinguished by dense spikes, unequal corollas, by bearded stipulas, ascending stalks, and by the calyx having four equal teeth. This is the botanical description of this species given by Mr Afzelius, who, in a paper of the first volume of the Linnæan Transactions, has been at much pains to remove three species of the trifolium from the confusion in which they have been long involved; namely, the *pratense*, *medium*, and *alpestre*. The red clover is common in meadows and pastures, and is the species which is generally cultivated as food for cattle. It abounds in every part of Europe, in North America, and

even in Siberia. It delights most in rich, moist, and sunny places; yet flourishes in dry, barren, and shady places. For an account of the mode of cultivating it, see *AGRICULTURE*, n° 177.

4. *Alpestre*, long-leaved purple trefoil, or mountain clover, is thus characterized by Mr Afzelius. The spikes are dense; the corollas somewhat equal; the stipulas are bristly and divergent; the leaflets lanceolated; the stalks stiff, straight, and very simple. It grows in dry, mountainous, woody places, in Hungary, Austria, and Bohemia, &c.; but is not said by Mr Afzelius to be a native of Britain.

5. The *medium*, according to Mr Afzelius, has also been confounded with the two species last mentioned; but it is to be distinguished from them by having loose spikes, corollas somewhat equal, stipulas subulate and connivent, and stalks flexuose and branched. It is found in dry elevated situations, especially among shrubs, or in woods where the soil is chalky or clay, in England, Scotland, Sweden, Denmark, &c.

For a botanical description of the other species of the trifolium, see Lightfoot's *Flora Scotica*, Berkenhout's Synopsis of the Natural History of Great Britain and Ireland, and Withering's Botanical Arrangements.

TRIGA, in antiquity, denotes a kind of carr or chariot drawn by three horses; whence the name.

TRIGLA, in ichthyology, a genus of fishes belonging to the order of thoracici. The head is loricated with rough lines, and there are seven rays in the membranes of the gills. There are 11 species; of which the principal are the gurnard, or grey gurnard; the cuculus, or red gurnard; the lyra, or piper; and the hirundo, or sapphire gurnard.

TRIGLOCHIN, in botany: A genus of plants belonging to the class of *hexandria*, and order of *trigynia*; and in the natural system ranging under the fifth order, *Tripelatoideæ*. The calyx is triphyllous; the petals are three; there is no style; the capsule opens at the base. There are three species; of which the *palustre* and *maritimum* are British.

1. *Palustre*, or arrow-headed grass, has an oblong trilocular capsule. The stalk is simple, eight or ten inches high; the leaves long and narrow; the flowers are greenish, and grow at the end of a long spike. It is frequent in moist ground.

2. *Maritimum*, or sea-spiked grass, has ovate sexlocular capsules; the stalk is short; the spike long, and flowers purplish. It is frequent on the sea-coasts. Linnæus says that cattle eat these two species with avidity.

TRIGLYPHS, in architecture, a sort of ornaments repeated at equal intervals, in the Doric frieze.

Dialing TRIGON. See *DIALING*.

TRIGONALIS. See *PILA*.

TRIGONELLA, **FENUGREEK**, in botany: A genus of plants belonging to the class of *diadelphia*, and order of *decandria*; and in the natural system arranged under the 32d order, *Papilionaceæ*. The vexillum and alæ are nearly equal and patent, resembling a tripetalous corolla. There are 12 species; of which the most remarkable is the *fenugracum*, or fenugreek, a native of Montpellier in France.

Fenugreek is an annual plant, which rises with a hollow, branching, herbaceous stalk, a foot and a half long, garnished with trifoliate leaves, placed alternately, whose lobes are oblong, oval, indented on their edges, and have broad furrowed footstalks.

Fenugreek seeds have a strong disagreeable smell, and an unctuous farinaceous taste accompanied with a slight bitterness. The principal use of these seeds is in cataplasms and fomentations, for softening, maturing, and discharging tumors; and in emollient and carminative glysters. They are an ingredient in the *oleum e mucilaginis* of the shops, to which they communicate a considerable share of their smell.

White bear.



Gryphus.



Vampire.

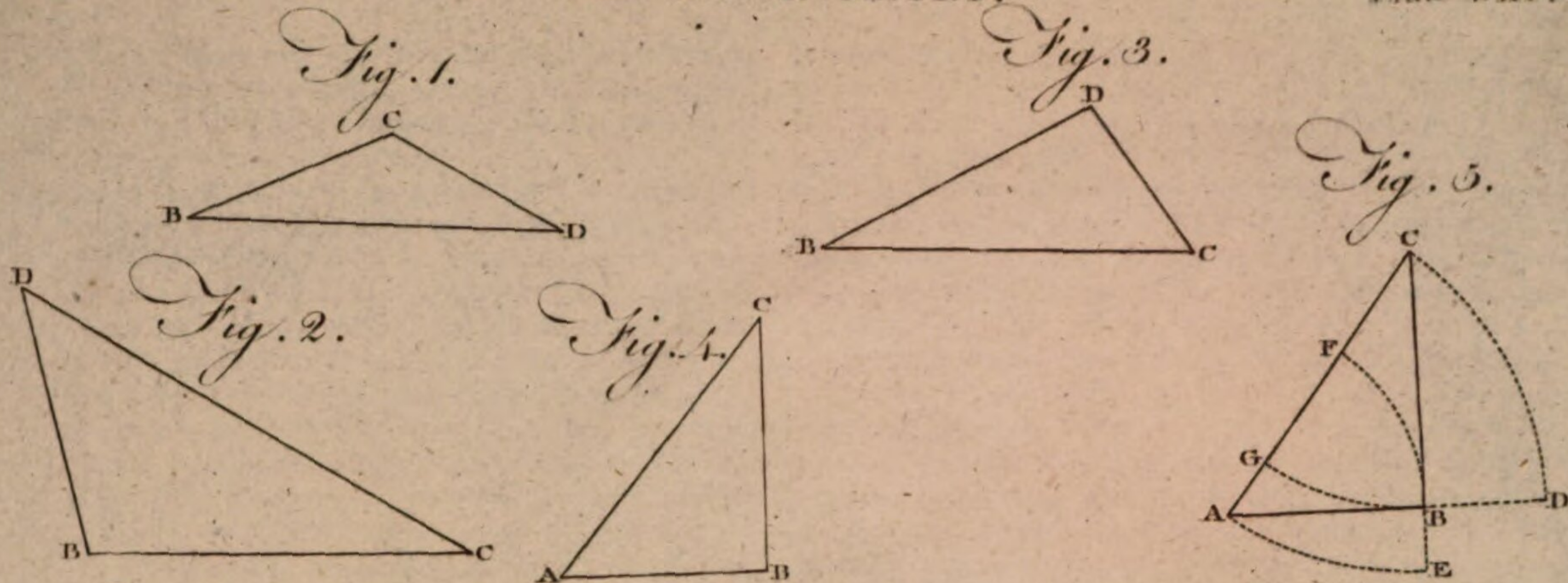


Walrus.

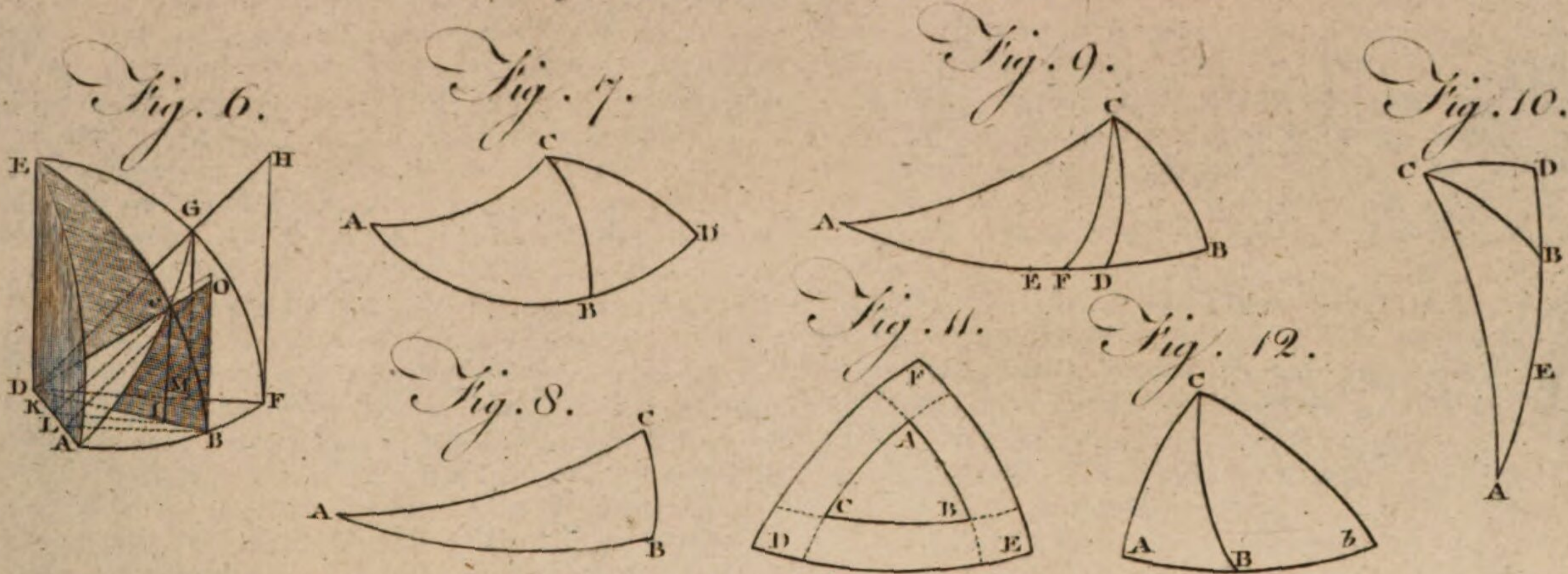


Plane TRIGONOMETRY.

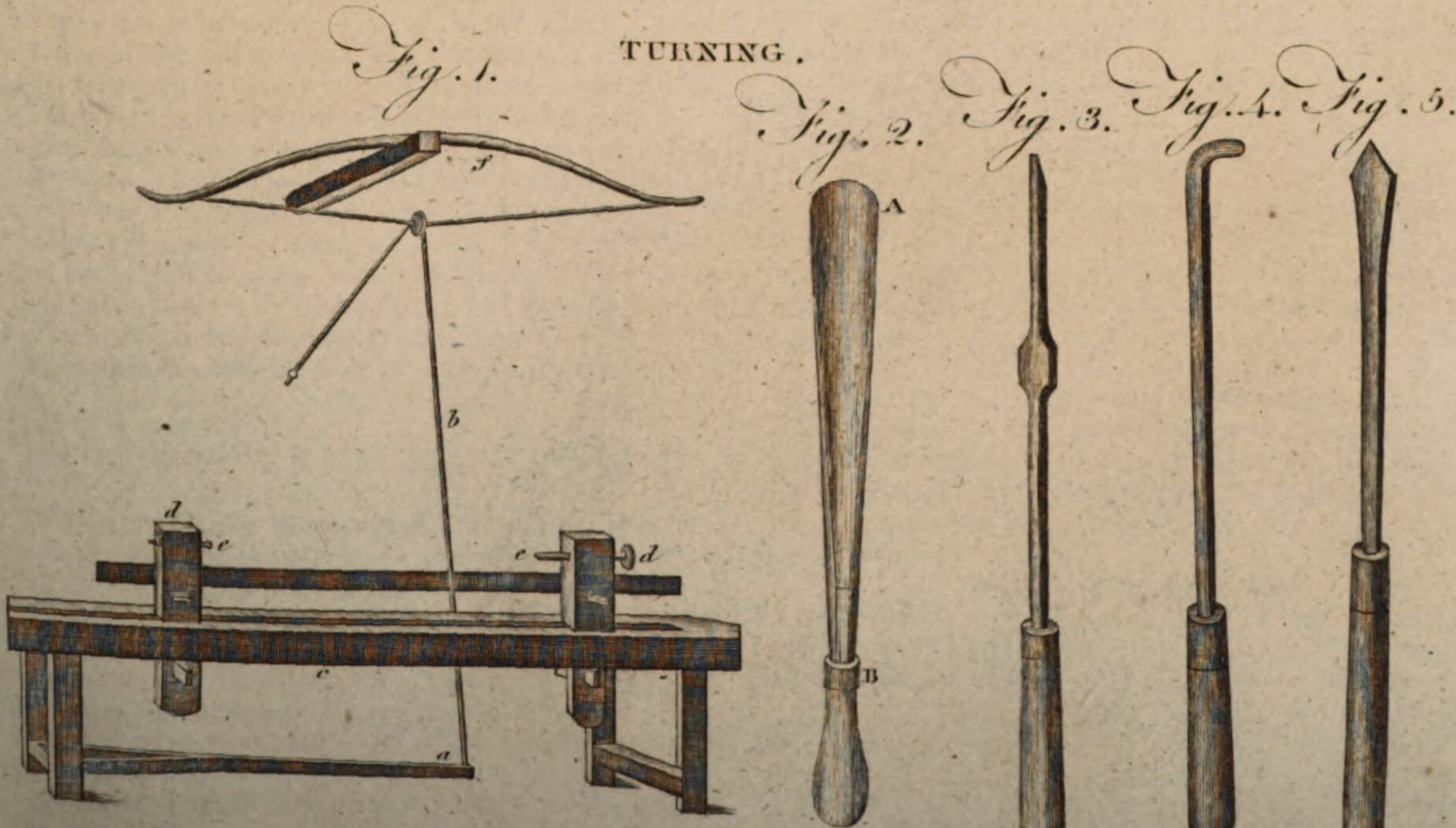
Plate DXI.



Spherical TRIGONOMETRY.



TURNING.



T R I G O N O M E T R Y,

Plane. **T**HE art of measuring the sides and angles of triangles, either plane or spherical, whence it is accordingly called either PLANE TRIGONOMETRY, or SPHERICAL TRIGONOMETRY.

Trigonometry is an art of the greatest use in the mathematical sciences, especially in astronomy, navigation, surveying, dialing, geography, &c. &c. By it we come to know the magnitude of the earth, the planets and stars, their distances, motions, eclipses, and almost all other useful arts and sciences. Accordingly we find this art has been cultivated from the earliest ages of mathematical knowledge.

Trigonometry, or the resolution of triangles, is founded on the mutual proportions which subsist between the sides and angles of triangles; which proportions are known by finding the relations between the radius of a circle and certain other lines drawn in and about the circle, called *cords*, *sines*, *tangents*, and *secants*. The ancients, Menelaus, Hipparchus, Ptolemy, &c. performed their trigonometry by means of the cords. As to the sines, and the common theorems relating to them, they were introduced into trigonometry by the Moors or Arabians, from whom this art passed into Europe, with several other branches of science. The Europeans have introduced, since the 15th century, the tangents and secants, with the theorems relating to them.

The proportion of the sines, tangents, &c. to their radius, is sometimes expressed in common or natural numbers, which constitute what we call the *tables of natural sines, tangents, and secants*. Sometimes it is expressed in logarithms, being the logarithms of the said natural sines, tangents, &c.; and these constitute the table of *artificial sines*, &c. Lastly, sometimes the proportion is not expressed in numbers; but the several sines, tangents, &c. are actually laid down upon lines of scales; whence the *line of sines, of tangents*, &c.

In trigonometry, as angles are measured by arcs of a circle described about the angular point, so the whole circumference of the circle is divided into a great number of parts; as 360 degrees, and each degree into 60 minutes, and each minute into 60 seconds, &c.; and then any angle is said to consist of so many degrees, minutes, and seconds, as are contained in the arc that measures the angle, or that is intercepted between the legs or sides of the angle.

Now the sine, tangent, and secant, &c. of every degree and minute, &c. of a quadrant, are calculated to the radius 1, and ranged in tables for use; as also the logarithms of the same; forming the triangular canon. And these numbers, so arranged in tables, form every species of right-angled triangles; so that no such triangle can be proposed, but one similar to it may be there found, by comparison with which the proposed one may be computed by analogy or proportion.

PLANE TRIGONOMETRY.

THERE are usually three methods of resolving triangles, or the cases of trigonometry; viz. geometrical construction, arithmetical computation, and instrumental operation. In the 1st method, the triangle in question is constructed by drawing and laying down the several parts of their magnitudes given, viz. the sides from a scale of equal parts, and the angles from a scale of cords or other instrument; then the unknown parts are measured by the same scales, and so they become known.

In the 2d method, having stated the terms of the proportion according to rule, which terms consist partly of the

numbers of the given sides, and partly of the sines, &c. of angles taken from the tables, the proportion is then resolved like all other proportions, in which a 4th term is to be found from three given terms, by multiplying the 2d and 3d together, and dividing the product by the 1st. Or, in working with the logarithms, adding the logarithm of the 2d and 3d terms together, and from the sum subtracting the logarithm of the 1st term; then the number answering to the remainder is the 4th term sought.

To work a case instrumentally, as suppose by the logarithm lines on one side of the two foot scales: Extend the compasses from the 1st term to the 2d or 3d, which happens to be of the same kind with it; then that extent will reach from the other term to the 4th. In this operation, for the sides of triangles, is used the line of numbers (marked Num.); and for the angles, the line of sines or tangents (marked sin. and tan.) according as the proportion respects sines or tangents. See SECTOR.

In every case of plane triangles there must be three parts, one at least of which must be a side. And then the different circumstances, as to the three parts that may be given, admit of three cases or varieties only; viz.

1st, When two of the three parts given are a side and its opposite angle. 2d, When there are given two sides and their contained angle. 3d, And, thirdly, when the three sides are given.

To each of these cases there is a particular rule or proportion adapted for resolving it by.

1st, *The Rule for the 1st Case*, or that in which, of the three parts that are given, an angle and its opposite side are two of them, is this, viz. that the sides are proportional to the sines of their opposite angles; that is,

As one side given :
To the sine of its opposite angle : :
So is another side given :
To the sine of its opposite angle.

Or,

As the sine of an angle given :
To its opposite side : :
So is the sine of another angle given :
To its opposite side.

So that, to find an angle, we must begin the proportion with a given side that is opposite to a given angle; and to find a side, we must begin with an angle opposite to a given side.

Example. Suppose in the triangle BDC (fig. 1.) there be given the side BC = 106, DB = 65, and the angle BCD 31° 49' given; to find the angle BDC obtuse and the side CD. Plate DXI.

1. Geometrically by Construction.

Draw the line BC equal to 106, at C make an angle of 31° 49' by drawing CD, take 65 in your compasses, and with one foot in B lay the other upon the line CD in D; draw the line BD, and it is done; for the angle D will be 120° 43', the angle B 27° 28', and the side DC 56.9 as was required.

2. Arithmetically by Logarithms.

As the side BD 65 - - - - - log. 1.81291
Is to sine angle C 31° 49' - - - - - 9.72198
So is the side BC 106 - - - - - 2.02531

11.74729
1.81291

To sine angle D 120° 43' - - - - - 9.93438
To

Plane.

To find DC.
 As fine ang. C $31^{\circ} 49'$ 9.72198
 Is to the side BD 65 1.81291
 So is fine ang. B $27^{\circ} 28'$ 9.66392

 11.47683
 9.72198

 To the side DC 56.88 1.75485

180.0
 The supp. $59^{\circ} 17'$ of ang. D.

 120.43 angle D.
 31.49 angle C.

 152.32 their sum.

 180.0
 152.32 sum subtr.

 27.28 angle B.

Here it may be proper to observe, that if the given angle be obtuse, the angle sought will be acute; but when the given angle is acute, and opposite to a lesser given side, then the required angle is doubtful, whether acute or obtuse; it ought therefore to be determined before the operation. For it is plain the above proportion produces $59^{\circ} 17'$ for the required angle; but as it is obtuse, its supplement to 180 degrees must be taken, viz. $120^{\circ} 43'$.

By Gunter.

"The extent from 65 to 106 on the line of numbers will reach from $31^{\circ} 49'$ to $59^{\circ} 17'$ on the line of sines."

2dly, "The extent from $31^{\circ} 49'$ to $27^{\circ} 28'$ on the line of sines will reach from 65 to 56.88 on the line of numbers."

CASE II. When there are given two sides and their contained angle, to find the rest, the rule is this:

As the sum of the two given sides:

Is to the difference of the sides ::

So is the tangent of half the sum of the two opposite angles or cotangent of half the given angle:

To tang. of half the diff. of those angles.

Then the half diff. added to the half sum, gives the greater of the two unknown angles; and subtracted leaves the less of the two angles.

Hence, the angles being now all known, the remaining 3d side will be found by the former case.

Example. The side BC = 109, BD = 76 (fig. 2.), and the angle CBD $101^{\circ} 30'$ given, to find the angle BDC or BCD, and the side CD.

1. Geometrically by Construction.

Draw the line BC 109, and BD, so as to make an angle with BC of $101^{\circ} 30'$, and make BD equal to 76; join BC and BD with a right line, and it is done; for the angle D being measured by the cord of 60° , will be $47^{\circ} 32'$, angle C $30^{\circ} 58'$, and the side DC 144.8, as was required.

2. Arithmetically by Logarithms.

Side BC	109	-	109	-	180° 0'
BD	76	-	76	-	101 30
Their sum	185		33	their diff.	78 30 sum of the ang.

 $\frac{1}{2}$ Sum $39^{\circ} 15'$ then

To find the angles D and C.

As the sum of the sides BC and BD = 185	2.26717
Is to their difference	-
So is tang. of $\frac{1}{2}$ the sum of the angles C and D $39^{\circ} 15'$	9.91224
	11.43075
	2.26717

To the tang of $\frac{1}{2}$ the diff. of the angles C and D $8^{\circ} 17'$ 9.16358

To half the sum of the angles D and C	39° 15
Add half the difference of the angles C and D	8 17

Gives the greater angle D 47 32
 Subtracted, gives the lesser angle C 30 58

To find DC.

As fine angle D $47^{\circ} 32'$	-	-	9.86786
Is to the side BC 109	-	-	2.03743
So is fine angle B $101^{\circ} 30'$	-	-	9.99119
			12.02862
			9.86786
To the side DC required	144.8		2.16076

3. By Gunter.

1st, "The extent from 185 to 33 on the line of numbers will reach from $39^{\circ} 15'$ to $8^{\circ} 17'$ on the line of tangents. 2dly, The extent from angle D $47^{\circ} 32'$ to $78^{\circ} 30'$ (the supplement of angle B) on the line of sines, will reach from the side BC 109 to 144.8, the side DC required, on the line of numbers."

CASE III. Is when the three sides are given, to find the three angles; and the method of resolving this case is, to let a perpendicular fall from the greatest angle upon the opposite side or base, dividing it into two segments, and the whole triangle into two smaller right-angled triangles: then it will be,

As the base or sum of the two segments:

Is to the sum of the other two sides ::

So is the difference of those sides :

To the difference of the segments of the base.

Then half this difference of the two segments added to the half sum, or half the base, gives the greater segment, and subtracted gives the less. Hence, in each of the two right-angled triangles, there are given the hypotenuse, and the base, besides the right angle, to find the other angles by the first case.

Example. The sides BC (fig. 3.) = 105, BD = 85, and CD = 50, given to find the angles BDC, BCD, or CBD.

1. Geometrically by Construction.

Draw the line BC equal to 105, take CD 50 in your compasses, and with one foot in C describe an arch; then take BD 85 in your compasses, and with one foot in B cut the former arch in D, join BD and DC, and it is done; for the angle B, being measured, will be found $28^{\circ} 4'$, angle C $53^{\circ} 7'$, which being added together, is $81^{\circ} 11'$, their sum subtracted from 180, leaves angle D $98^{\circ} 49'$ as was required.

2 Arithmetically by Logarithms.

The two shortest sides are BD (=85) and CD (=50), the sum of which is 135, and their difference 35. The segments of the base BC are found in this manner:

As the side BC	= 105	log. 2.02119
Is to the sum of the sides BD & DC = 135	2.13033	
So is their difference	= 35	1.54407
To the difference of the seg. of BC	= 45	1.65321
Thus the sum and difference of the segments of the base BC being known, we have only to add half this sum = $52\frac{1}{2}$ to half the difference = $22\frac{1}{2}$, and we shall obtain the greater segment, which is = 75; which subtracted from 105, gives 30 = the smaller segment. Then		

To find the angle BDA.

As the hypotenuse BD	= 85	log. 1.92942
Is to radius	=	10.00000
So is the greater segment	= 75	1.87506
To the sum of the angle BDA	=	9.94564
The angle BDA therefore is equal to $61^{\circ} 56'$		

Let us now find the angle ADC, which is done thus.

As the hypotenuse DC	= 50	log. 1.69897
Is to radius	=	10.00000
So is the smaller segment	= 30	1.47712
To the sine of ADC	=	9.77815
The angle ADC therefore is equal to $36^{\circ} 53'$, and the whole angle BDC = $98^{\circ} 49'$.		

Plane. To find the angle at B, we have only to subtract the angle BDA ($=61^{\circ} 56'$) from 90° , and the rem. $28^{\circ} 4'$ is the angle sought. The angle at C is equal to $53^{\circ} 7'$.

3. By Gunter.

1st, 'The extent from 105 to 135, will reach from 35 to 45 on the line of numbers.' 2^{dly}, 'The extent from 85 to 75, on the line of numbers, will reach from radius to $61^{\circ} 56'$, the angle BDA on the line of sines.' 3^{dly}, 'The extent from 50 to 30 on the line of numbers, will reach from radius to angle ADC $36^{\circ} 53'$ on the line of sines.'

The foregoing three cases include all the varieties of plane triangles that can happen, both of right and oblique-angled triangles. But besides these, there are some other theorems that are useful upon many occasions, or suited to some particular forms of triangles, which are often more expeditious in use than the foregoing general ones; one of which, for right-angled triangles, as the case for which it serves so often occurs, may be here inserted, and is as follows.

CASE IV. When, in a right-angled triangle, there are given the angles and one leg, to find the other leg, or the hypotenuse. Then it will,

As radius :
To given leg AB ::
So tang. adjacent the angle A :
To the opposite leg BC, and ::
So sec. of same angle A :
To hypot. AC :

Example. In the triangle ABC (fig. 4.), right-angled at B,

Given the leg AB = 162
and the angle A = $53^{\circ} 7' 48''$
conseq. the angle C = $36^{\circ} 52' 12''$ } to find BC and AC.

1. Geometrically.—Draw the leg AB = 162 : Erect the indefinite perpendicular BC : Make the angle A = $53^{\circ} 7' 48''$, and the side AC will cut BC in C, and form the triangle ABC. Then, by measuring, there will be found AC = 270, and BC = 216.

2. Arithmetically.

As radius	= 10	-	-	log. 10.0000000
To AB	= 162	-	-	2.2095150
So tang. A	= $53^{\circ} 7' 48''$	-	-	10.1249372
To BC	= 216	-	-	2.3344522
So sec. A	= $53^{\circ} 7' 48''$	-	-	10.2218477
To AC	= 270	-	-	2.4313627

3. By Gunter.

Extend the compasses from 45° at the end of the tangents (the radius) to the tangent of $53^{\circ} 7' 48''$; then that extent will reach, on the line of numbers, from 162 to 216, for BC. Again, extend the compasses from $36^{\circ} 52'$ to 90 on the sines; then that extent will reach, on the line of numbers, from 162 to 270 for AC.

Note. Another method, by making every side radius, is often added by the authors on trigonometry, which is thus : The given right-angled triangle being ABC, make first the hypotenuse AC radius, that is, with the extent of AC as a radius, and each of the centres A and C, describe arcs CD and AE (fig. 5.); then it is evident that each leg will represent the sine of its opposite angle, viz. the leg BC the sine of the arc CD or of the angle A, and the leg AB the sine of the arc AE or of the angle C. Again, making either leg radius, the other leg will represent the tangent of its opposite angle, and the hypotenuse the secant of the same angle; thus, with radius AB and centre A describing the

arc BE, BC represents the tangent of that arc, or of the angle A, and the hypotenuse AC the secant of the same; or with the radius BC and centre C describing the arc BG, the other leg AB is the tangent of that arc BG or of the angle C, and the hypotenuse CA the secant of the same.

And then the general rule for all these cases is this, viz. that the sides bear to each other the same proportions as the parts or things which they represent. And this is called making every side radius.

SPHERICAL TRIGONOMETRY.

SPHERICAL TRIGONOMETRY is the art whereby, from three given parts of a spherical triangle, we discover the rest; and, like plane trigonometry, is either right-angled or oblique angled. But before we give the analogies for the solution of the several cases in either, it will be proper to premise the following theorems :

THEOREM I. In all right-angled spherical triangles, the sign of the hypotenuse : radius :: sine of a leg : sine of its opposite angle. And the sine of a leg : radius :: tangent of the other leg : tangent of its opposite angle.

Demonstration. Let EDAFG (ibid. fig. 6.) represent the eighth part of a sphere, where the quadrantal planes EDAFG, EDBC, are both perpendicular to the quadrantal plane ADFB; and the quadrantal plane ADGC is perpendicular to the plane EDAFG; and the spherical triangle ABC is right-angled at B, where CA is the hypotenuse, and BA, BC, are the legs.

To the arches GF, CB, draw the tangents HF, OB, and the sines GM, CI, on the radii DF, DB; also draw BL the sine of the arch AB, and CK the sine of AC; and then join IK and OL. Now HF, OB, GM, CI, are all perpendicular to the plane ADFB. And HD, GK, OL, lie all in the same plane ADGC. Also FD, IK, BL, lie all in the same plane ADGC. Therefore the right-angled triangles HFD, CIK, ODL, having the equal angles HDF, CKI, OLB, are similar. And CK : DG :: CI : GM; that is, as the sine of the hypotenuse : rad. :: sine of a leg : sine of its opposite angle. For GM is the sine of the arc GF, which measures the angle CAB. Also, LB : DF :: BO : FH; that is, as the sine of a leg : radius :: tangent of the other leg : tangent of its opposite angle. Q. E. D.

Hence it follows, that the sines of the angles of any oblique spherical triangle ACD (fig. 7.) are to one another, directly, as the sines of the opposite sides. Hence it also follows, that, in right-angled spherical triangles, having the same perpendicular, the sines of the bases will be to each other, inversely, as the tangents of the angles at the bases.

THEOREM II. In any right-angled spherical triangle ABC (fig. 8.) it will be, As radius is to the co-sine of one leg, so is the co-sine of the other leg to the co-sine of the hypotenuse.

Hence, if two right-angled spherical triangles ABC, CBD (fig. 7.) have the same perpendicular BC, the co-sines of their hypotenuses will be to each other, directly, as the co-sines of their bases.

THEOREM III. In any spherical triangle it will be, As radius is to the sine of either angle, so is the co-sine of the adjacent leg to the co-sine of the opposite angle.

Hence, in right-angled spherical triangles, having the same perpendicular, the co-sines of the angles at the base will be to each other, directly, as the sines of the vertical angles.

THEOREM IV. In any right-angled spherical triangle

Spherical. it will be, As radius is to the co-sine of the hypotenuse, so is the tangent of either angle to the co-tangent of the other angle.

As the sum of the sines of two unequal arches is to their difference, so is the tangent of half the sum of those arches to the tangent of half their difference: and as the sum of the co-sines is to their difference, so is the co-tangent of half the sum of the arches to the tangent of half the difference of the same arches.

THEOREM V. In any spherical triangle ABC (fig. 9 and 10.) it will be, As the co-tangent of half the sum of half their difference, so is the co-tangent of half the base to the tangent of the distance (DE) of the perpendicular from the middle of the base.

Since the last proportion, by permutation, becomes co-tang. $\frac{AC+BC}{2}$: co-tang. AE :: tang. $\frac{AC-BC}{2}$: tang.

DE, and as the tangents of any two arches are, inversely, Spherical, as their co-tangents; it follows, therefore, that tang. AE :

$$\text{tang. } \frac{AC+BC}{2} :: \text{tang. } \frac{AC-BC}{2} : \text{tang. DE}; \text{ or, that}$$

the tangent of half the base is to the tangent of half the sum of the sides, as the tangent of half the difference of the sides to the tangent of the distance of the perpendicular from the middle of the base.

THEOREM VI. In any spherical triangle ABC (fig. 9.) it will be, As the co-tangent of half the sum of the angles at the base is to the tangent of half their difference, so is the tangent of half the vertical angle to the tangent of the angle which the perpendicular CD makes with the line CF bisecting the vertical angle.

The Solution of the Cases of right-angled spherical Triangles, (fig. 8.).

Case	Given	Sought	Solution
1	The hyp. AC and one angle A	The opposite leg BC	As radius : sine hyp. AC :: sine A : sine BC (by the former part of theor. 1.)
2	The hyp. AC and one angle A	The adjacent leg AB	As radius : co-sine of A :: tang. AC : tang. AB (by the latter part of theor. 1.)
3	The hyp. AC and one angle A	The other angle C	As radius : co-sine of AC :: tang. A : co-tang. C (by theorem 4.)
4	The hyp. AC and one leg AB	The other leg BC	As co-sine AB : radius :: co-sine AC : co-sine BC (by theorem 2.)
5	The hyp. AC and one leg AB	The opposite angle C	As sine AC : radius :: sine AB : sine C (by the former part of theorem 1.)
6	The hyp. AC and one leg AB	The adjacent angle A	As tang. AC : tang. AB :: radius : co-sine A (by theorem 1.)
7	One leg AB and the adjacent angle A	The other leg BC	As radius : sine AB :: tangent A : tangent BC (by theorem 4.)
8	One leg AB and the adjacent angle A	The opposite angle C	As radius : sine A :: co-sine of AB : co-sine of C (by theorem 3.)
9	One leg AB and the adjacent angle A	The hyp. AC	As co-sine of A : radius :: tang. AB : tang. AC (by theorem 1.)
10	One leg BC and the opposite angle A	The other leg AB	As tang. A : tang. BC :: radius : sine AB (by theorem 4.)
11	One leg BC and the opposite angle A	The adjacent angle C	As co-sine BC : radius :: co-sine of A : sine C (by theorem 3.)
12	One leg BC and the opposite angle A	The hyp. AC	As sine A : sine BC :: radius : sine AC (by theorem 1.)
13	Both legs AB and BC	The hyp. AC	As radius : co-sine AB :: co-sine BC : co-sine AC (by theorem 2.)
14	Both legs AB and BC	An angle, suppose A	As sine AB : radius :: tang. BC : tang. A (by theorem 4.)
15	Both angles A and C	A leg, suppose AB	As sine A : co-sine C :: radius : co-sine AB (by theorem 3.)
16	Both angles A and C	The hyp. AC	As tang. A : co-tang. C :: radius : co-sine AC (by theorem 4.)

Note, The 10th, 11th, and 12th cases are ambiguous; since it cannot be determined by the data, whether A, B, C, and AC, be greater or less than 90 degrees each.

The Solution of the Cases of oblique spherical Triangles, (fig. 9 and 10.)

Case	Given	Sought	Solution
1	Two sides AC, BC, and an angle A opposite to one of them.	The angle B opposite to the other	As sine BC : sine A :: sine AC : sine B (by theorem 1.) Note, this case is ambiguous when BC is less than AC; since it cannot be determined from the data whether B be acute or obtuse.
2	Two sides AC, BC, and an angle A opposite to one of them	The included angle ACB	Upon AB produced (if need be) let fall the perpendicular CD; then (by theorem 4.) rad. : co-sine AC :: tang. A : co-tang. ACD; but (by theorem 1.) as tang. BC : tang. AC :: co-sine ACD : co-sine BCD. Whence $\angle ACB = \angle ACD \pm \angle BCD$ is known.
3	Two sides AC, BC, and an angle opposite to one of them	The other side AB	As rad. : co-sine A :: tang. AC : tang. AD (by theor. 1) and (by theor. 2.) as co-sine AC : co-sine BC :: co-sine AD : co-sine BD. Note, this and the last case are both ambiguous when the first is so.
4	Two sides AC, AB, and the included angle A	The other side BC	As rad. : co-sine A :: tang. AC : tang. AB (by theor. 1.) whence AD is also known; then (by theor. 2.) as co-sine AD : co-sine BD :: co-sine AC : co-sine BC.
5	Two sides AC, AB, and the included angle A	Either of the other angles, suppose B	As rad. : co-sine A :: tang. AC : tang. AD (by theor. 1.) whence BD is known; then (by theor. 4.) as sine BD : sine AD :: tang. A : tang. B.
6	Two angles A, ACB, and the side AC betwixt them	The other angle B	As rad. : co-sine AB :: tang. A : co-tang. ACD (by theorem 4.) whence BCD is also known; then (by theor. 3.) as sine ACD : sine BCD :: co-sine A : co-sine B.
7	Two angles A, ACB, and the side AC betwixt them	Either of the other sides, suppose BC	As rad. : co-sine AC :: tang. A : co-tang. ACD (by theorem 4.) whence BCD is also known: then, as co-sine BCD : co-sine ACD :: tang. AC : tang. BC (by theor. 1.)
8	Two angles A, B, and a side AC opposite to one of them	The side BC opposite the other	As sine B : sine AC :: sine A : sine BC (by theorem 1.)
9	Two angles A, B, and a side AC opposite to one of them	The side AB betwixt them	As rad. : co-sine A :: tang. AC : tang. AD (by theor. 1.) and as : tang. B : tang. A :: sine AD : sine BD (by theorem 4.) whence AB is also known.
10	Two angles A, B, and a side AC opposite to one of them	The other angle ACB	As rad. : co-sine AC :: tang. A : co-tang. ACD (by theorem 4.) and as co-sine A : co-sine B :: sine ACD : sine BCD (by theor. 3.) whence ACB is also known.
11	All the three sides AB, AC, and BC	An angle, suppose A	As tang. $\frac{1}{2}AB$: tang. $\frac{AC+BC}{2}$:: tang. $\frac{AC-BC}{2}$: tang. DE, the distance of the perpendicular from the middle of the base (by theorem 6.) whence AD is known: then, as tang. AC : tang. AD :: rad. : co-sine A (by theor. 1.)
12	All the three angles A, B, and ACB	A side, suppose AC	As co-tang. $\frac{ABC+A}{2}$: tang. $\frac{ABC-A}{2}$:: tang. $\frac{ACB}{2}$: tan. of the angle included by the perpendicular and a line bisecting the vertical angles; whence ACD is also known: then (by theorem 5.) tang. A : co-tang. ACD :: rad. co-sine AC.

Hutton's Mathematical Dictionary.
The following propositions and remarks, concerning spherical triangles (selected and communicated to Dr Hutton by the reverend Nevil Maskelyne, D. D. Astronomer Royal, F. R. S.), will also render the calculation of them perspicuous, and free from ambiguity.

1. A spherical triangle is equilateral, isoscelar, or scalene, according as it has its three angles all equal, or two of them equal, or all three unequal; and *vice versa*.

2. The greatest side is always opposite the greatest angle, and the smallest side opposite the smallest angle.

3. Any two sides taken together are greater than the third.

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4. If the three angles are all acute, or all right, or all obtuse; the three sides will be, accordingly, all less than 90° , or equal to 90° , or greater than 90° ; and *vice versa*.

5. If from the three angles A, B, C, of a triangle ABC, as poles, there be described, upon the surface of the sphere, three arches of a great circle DE, DF, FE, forming by their intersections a new spherical triangle DEF; each side of the new triangle will be the supplement of the angle at its pole; and each angle of the same triangle will be the supplement of the side opposite to it in the triangle ABC.

6. In any triangle ABC, or A'B'C, right-angled in A, *Fig. 12.* The angles at the hypotenuse are always of the same kind

spherical. as their opposite sides; 2dly, The hypotenuse is less or greater than a quadrant, according as the sides including the right angle are of the same or different kinds; that is to say, according as these same sides are either both acute or both obtuse, or as one is acute and the other obtuse. And *vice versa*,

1st, The sides including the right angle are always of the same kind as their opposite angles: 2dly, The sides including the right angle will be of the same or different kinds, according as the hypotenuse is less or more than 90° ; but one at least of them will be of 90° , if the hypotenuse is so. *Spheric-L.*

T R I

Trihilate TRIHILATÆ, from *tres* "three," and *bilum* "an external mark on the seed;" the name of the 23d class in Linnæus's Fragments of a Natural Method; consisting of plants with three seeds, which are marked with an external cicatrix or scar, where they are fastened within the fruit. See BOTANY, Sect. 6.

TRIM, implies in general the state or disposition by which a ship is best calculated for the several purposes of navigation.

Thus the trim of the hold denotes the most convenient and proper arrangement of the various materials contained therein relatively to the ship's motion or stability at sea. The trim of the masts and sails is also their most apposite situation with regard to the construction of the ship and the effort of the wind upon her sails. See SEAMANSHIP.

TRINGA, SANDPIPER; a genus of birds belonging to the order of *gralla*. The bill is somewhat tapering, and of the length of the head; the nostrils are small; the toes are four in number and divided, the hind toe being frequently raised from the ground. According to Dr Latham there are 45 species, of which 18 are British. We shall describe some of the most remarkable.

1. *Vanellus*, lapwing, or tewit, is distinguished by having the bill, crown of the head, crest, and throat, of a black colour; there is also a black line under each eye; the back is of a purplish green; the wings and tail are black and white, and the legs red: the weight is 8 ounces and the length 13 inches. It lays four eggs, making a slight nest with a few bents. The eggs have an olive cast, and are spotted with black. The young, as soon as hatched, run like chickens: the parents show remarkable solicitude for them, flying with great anxiety and clamour near them, striking at either men or dogs that approach, and often fluttering along the ground like a wounded bird, to a considerable distance from their nest, to delude their pursuers; and to aid the deceit, they become more clamorous when most remote from it: the eggs are held in great esteem for their delicacy, and are sold by the London poulterers for three shillings the dozen. In winter, lapwings join in vast flocks; but at that season are very wild: their flesh is very good, their food being insects and worms. During October and November, they are taken in the fens in nets, in the same manner that ruffs are; but are not preserved for fattening, being killed as soon as caught.

2. *Pugnax*. The male of this species is called *ruff*, and the female *reeve*. The name *ruff* is given to the males because they are furnished with very long feathers, standing out in a remarkable manner, not unlike the ruff worn by our ancestors. The ruff is of as many different colours as there are males; but in general it is barred with black; the weight is six or seven ounces; the length, one foot. The female, or *reeve*, has no ruff; the common colour is brown; the feathers are edged with a very pale colour; the breast and belly white. Its weight is about four ounces.

These birds appear in the fens in the earliest spring, and disappear about Michaelmas. The reeves lay four eggs in

T R I

a tuft of grass, the first week in May, and sit about a month. The eggs are white, marked with large rusty spots. Fowlers avoid in general the taking of the females; not only because they are smaller than the males, but that they may be left to breed. *Tringa.*

Soon after their arrival, the males begin to hill, that is, to collect on some dry bank near a splash of water, in expectation of the females, who resort to them. Each male keeps possession of a small piece of ground, which it runs round till the grass is worn quite away, and nothing but a naked circle is left. When a female lights, the ruffs immediately fall to fighting. It is a vulgar error, that ruffs must be fed in the dark lest they should destroy each other by fighting on admission of light. The truth is, every bird takes its stand in the room as it would in the open fen. If another invades its circle, an attack is made, and a battle ensues. They make use of the same action in fighting as a cock, place their bills to the ground and spread their ruffs. Mr Pennant says, he has set a whole room-full a-fighting, by making them move their stations; and after quitting the place, by peeping through a crevice, seen them resume their circles and grow pacific.

When a fowler discovers one of those hills, he places his net over night, which is of the same kind as those that are called *clap* or *day nets*; only it is generally single, and is about 14 yards long and four broad. The fowler resorts to his stand at day-break, at the distance of one, two, three, or four hundred yards from the nets, according to the time of the season; for the later it is, the shyer the birds grow. He then makes his first pull, taking such birds as he finds within reach: after that he places his stuffed birds or stales to entice those that are continually traversing the fen. When the stales are set, seldom more than two or three are taken at a time. A fowler will take 40 or 50 dozen in a season. —These birds are found in Lincolnshire, the isle of Ely, and in the East Riding of York. They visit a place called *Martin Mere* in Lancashire the latter end of March or beginning of April; but do not continue there above three weeks; where they are taken in nets, and fattened for the table with bread and milk, hempseed, and sometimes boiled wheat; but if expedition is required, sugar is added, which will make them in a fortnight's time a lump of fat: they then sell for two shillings or half a crown a-piece. They are dressed like the woodcock, with their intestines; and when killed at the critical time, say the Epicures, are the most delicious of all morsels.

3. *Canutus*, or knot, has the forehead, chin, and lower part of the neck, brown, inclining to ash-colour; the back and scapulars deep brown, edged with ash-colour; the coverts of the wings white, the edges of the lower order deeply so, forming a white bar; the breast, sides, and belly white, the two first streaked with brown; the coverts of the tail marked with white and dusky spots alternately; the tail ash coloured, the outmost feather on each side white; the legs of a bluish grey; and the toes, as a special mark, divided to the very bottom; the weight four ounces and a half—

Tringa
||
Trinita-
rians.

half.—These birds, when fattened, are preferred by some to the ruffs themselves. They are taken in great numbers on the coasts of Lincolnshire, in nets such as are employed in taking ruffs; with two or three dozens of stales of wood painted like the birds, placed within; 14 dozens have been taken at once. Their season is from the beginning of August to that of November. They disappear with the first frosts. Camden says they derive their name from king Canute, Knute, or Knout, as he is sometimes called; probably because they were a favourite dish with that monarch. We know that he kept the feast of the purification of the Virgin Mary with great pomp and magnificence at Ely; and this being one of the ten-birds, it is not unlikely but he met with it there.

4. The *hypoleucos*, or common sandpiper, except in pairing time, is a solitary bird: it is never found near the sea, but frequents rivers, lakes, and other fresh waters. Its head is brown, streaked with downward black lines; the neck an obscure ash-colour; the back and coverts of the wings brown, mixed with a glossy green, elegantly marked with transverse dusky lines; the breast and belly are of a pure white; the quill-feathers and the middle feathers of the tail are brown; the legs of a dull pale green.

5. The *alpina*, or dunling sandpiper, is at once distinguished from the others by the singularity of its colours. The back, head, and upper part of the neck, are ferruginous, marked with large black spots; the lower part of the neck white, marked with short dusky streaks; the coverts of the wings ash-colour; the belly white, marked with large black spots, or with a black crescent pointing towards the thighs; the tail is ash-coloured; legs black; toes divided to their origin. In size it is superior to that of a lark. These birds are found on our sea-coasts; but may be reckoned among the more rare kinds. They lay four eggs of a dirty white colour, blotched with brown round the thicker end, and marked with a few small spots of the same colour on the smaller end. They are common on the Yorkshire coasts, and esteemed a great delicacy.

6. The *cinclus*, purre, or stint, is in length $7\frac{1}{2}$ inches; the head and hind part of the neck are ash-coloured, marked with dusky lines; a white stroke divides the bill and eyes; the back is of a brownish ash-colour; the breast and belly white; the coverts of the wings and tail a dark brown, edged with light ash-colour or white; the upper part of the quill-feathers dusky, the lower white; the legs of a dusky green; the toes divided to their origin. The bill an inch and a half long, slender, and black; irides dusky.—These birds come in prodigious flocks on our sea-coasts during the winter: in their flight they perform their evolutions with great regularity; appearing like a white or a dusky cloud, as they turn their backs or their breasts towards you. They leave our shores in spring, and retire to some unknown place to breed. They were formerly a well known dish at our tables.

TRINIDAD, an island in the gulf of Mexico, separated from New Andalusia, in Terra Firma, by a strait, about three miles over. The soil is fruitful, producing sugar, cotton, Indian corn, fine tobacco, and fruits; but the air is unhealthy. It was taken by Sir Walter Raleigh in 1595, and by the French in 1676, who plundered the island and then left it. It is about 62 miles in length, and 45 in breadth; and was discovered by Christopher Columbus in 1498. There is a bituminous lake in this island; for an account of which, see the article PETROLEUM, p. 252. note B.

TRINITARIANS, those who believe in the Trinity; those who do not believe therein being called *Antitrinitarians*.

TRINITY, in theology, the ineffable mystery of three persons in one God; Father, Son, and Holy Spirit. See THEOLOGY. n° 61.

TRINITY-House. See LONDON, n° 49.

TRINITY-Sunday, a festival observed on the Sunday next after Whitsunday, in honour of the holy Trinity. The observation of this festival was first enjoined in the council of Arles, anno 1260.

TRINOBANTES, (anc. geog.) a people of Britain, supposed to have occupied Middlesex and Essex.

TRIO, in music, a part of a concert wherein three persons sing; or, more properly, a musical composition consisting of three parts.

TRIPHTHONG, in grammar, an assemblage or concurrence of three vowels in one syllable; as *que*.

TRIPLE, in music, is one of the species of measure or time. See MUSIC.

TRIPOD, in antiquity, a famed sacred seat or stool, supported by three feet, whereon the priests and sibyls were placed to render oracles. It was on the tripod that the gods were said to inspire the Pythias with that divine fury and enthusiasm wherewith they were seized at the delivery of their predictions.

TRIPOLI, a country of Africa, in Barbary; bounded on the north by the Mediterranean sea; on the south, by the country of the Berberies; on the west, by the kingdom of Tunis, Biledulgerid, and a territory of the Gadamis; and on the east, by Egypt. It is about 925 miles along the sea coast; but the breadth is various. Some parts of it are pretty fruitful; but that towards Egypt is a sandy desert. It had the title of a kingdom; but is now a republic, governed by a dey. He is not absolute, for a Turkish bashaw resides here, who receives his authority from the grand seignior, and has a power of controlling the dey, and levying taxes on the people. The dey is elected by the soldiers, who make no scruple of deposing him when they please.

TRIPOLI, a considerable town of Africa, and capital of a republic of the same name in Barbary, and under protection of the grand seignior, with a castle and a fort. It is pretty large, and the inhabitants are noted pirates. It was taken by Charles V. who settled the knights of Malta there; but they were driven away by the Turks in 1551. It was formerly very flourishing; and has now some trade in stuffs, saffron, corn, oil, wool, dates, ostrich feathers, and skins: but they make more of the Christian slaves which they take at sea; for they either set high ransoms upon them, or make them perform all sorts of work. It is seated on the coast of the Mediterranean, in a sandy soil, and surrounded by a wall, strengthened by other fortifications. E. Long. 13. 12. N. Lat. 32. 34.

TRIPOLI, called *Tripolis* of Syria, to distinguish it from Tripoli in Barbary, received its name from its being anciently formed of three cities at a small distance from each other, one of which belonged to the Aradians, or ancient kingdom of Arad, the second to the Sidonians, and the third to the Tyrians, perhaps as a common mart to those maritime powers. The present town of Tripoli is built at the distance of a mile and a half from the other, upon the declivity of a hill facing the sea, in $34^{\circ} 20'$ north latitude, and in $35^{\circ} 50'$ east longitude from Greenwich. It is surrounded with walls, fortified with seven high strong towers, and a castle, all of Gothic architecture; but the streets are narrow, and the houses low. The city contains about 8000 houses, and near 60,000 inhabitants, consisting of Turks, Christians, and Jews. The basha, or pacha, who resides in the castle, where there is a garrison of 200 janizaries, governs the adjacent territory, in which there is plenty of fruit,

Trinity
||
Trioli.

Tripoli
||
Triticum.

and a great number of mulberry-trees, which enable the inhabitants to carry on a silk manufacture, from which they draw considerable profit.

All the environs of Tripoli are laid out in orchards, where the mopal grows spontaneously, and the white-mulberry is cultivated for the silk-worm; the pomegranate, orange, and lemon trees for their fruit, which is here very fine. The country, though delightful to the eye, is unhealthy; from July to September, epidemic fevers, like those of Scanderoon and Cyprus, prevail, and are principally caused by the artificial inundations made for the purpose of watering the mulberry trees, to enable them to throw out their second leaves, and from a want of free circulation of air, the city being open only to the westward.

TRIPOLI, a genus of argillaceous earth, much used in the polishing of metals. It has its name from Tripoli in Barbary, from whence it was formerly brought to us, and has the following properties: 1. It does not effervesce with any of the acids. 2. It hardens in the fire; and by a considerable heat, its surface becomes vitrified. 3. Every kind of it, excepting that found in England, becomes red by calcination. 4. It is fusible by mixture with calcareous earth, as well as by means of borax and microcosmic salt. 5. Generally no salt can be extracted by washing, though sometimes the marine and vitriolic acid may be extracted by distillation. 6. When crude it imbibes water, but is not diffusible in it. 7. It tastes like common chalk, and feels sandy between the teeth, though no sand can by any means be extracted from it.

Tripoli is found of two different kinds: 1. Solid, and of a rough texture; brown, yellowish, and spotted like marble. 2. Friable and compact; granulated, brown, or yellowish; this last being the kind met with in England. This last kind has also been found in Scotland; but the rotten stone found in Derbyshire, and likewise much used in polishing, is quite another substance. According to Ferber, the rotten stone is tripoli mixed with a calcareous earth. In the memoirs of the academy at Paris, for 1769, it is asserted, that tripoli is a volcanic product. In proof of this, we are there informed, that a coal-mine at St Etienne having accidentally taken fire, and the fire having extended to some beds of schistus and bitumen, tripoli was found in the burnt parts of the strata, but nowhere else. Cronstedt is of opinion, that 100 parts of it contain 90 of siliceous earth, 7 of argill, and 3 of iron; but the red sort probably contains more iron.

TRIPTOLEMUS, laws of. See MYSTERIES, n° 74.

TRIQUETROUS, among botanists, expresses a fruit or leaf that has three sides or faces all flat.

TRIREMIS, in antiquity, a galley with three ranks of oars on a side.

TRISMEGISTUS, an epithet or surname given to one of the two Hermeses. See THOTH.

TRISMUS, the LOCKED JAW. See MEDICINE, n° 280.

TRISSYLLABLE, in grammar, a word consisting of three syllables.

TRITICUM, WHEAT, in botany: A genus of plants belonging to the class of *triandria*, and order of *digynia*; and in the natural system ranging under the 4th order, *Gramina*. The calyx is bivalve, solitary, and generally containing three florets; the corolla is bivalve, one valve being bluntish, the other acute. There are 15 species; the *estivum*, summer or spring wheat; *hybernum*, winter Lammas, or common wheat; *compositum*, *turgidum*, or cone-wheat; *polonium*, or Polish wheat; *spelta*, or spelt wheat; *monococcum*, or one-grained wheat; *prostratum*, or trailing wheat-grass; *pumilum*, or dwarf wheat-grass; *juncum*, or rush wheat-grass; *repens*, or couch-grass;

tenellum, or tender wheat-grass; *maritimum*, or sea wheat-grass; *unilaterale*, or spiked sea-wheat; *unioloides*, or linear spiked wheat-grass.—Of what country the first six species are natives, cannot now be determined: the *prostratum* is a native of Siberia; the *juncum*, *repens*, *unilaterale*, and *maritimum*, are natives of Britain; the *tenellum* is a native of Spain; and the *unioloides* is a native of Italy. It may also be observed, that the first nine are annuals, the rest are perennials. See AGRICULTURE, n° 122; and HUSBANDRY, Part I.

Linnaeus comprehends the different kinds of wheat cultivated at present under six species; but cultivation has produced a great many varieties from these.

1. *Triticum aestivum*, or spring-wheat, hath four flowers in a calyx, three of which mostly bear grain. The calyces stand pretty distant from each other on both sides a flat smooth receptacle. The leaves of the calyx are keel shaped, smooth, and they terminate with a short arista. The glumes of the flowers are smooth and bellying, and the outer leaf of three of the glumes in every calyx is terminated by a long arista, but the three inner ones are beardless. The grain is rather longer and thinner than the common wheat. It is supposed to be a native of some part of Tartary. The farmers call it *Spring Wheat*, because it will come to the sickle with the common wheat, though it be sown in February or March. The varieties of it are: *Triticum aestivum spica et grana rubente*. Spring wheat, with a red spike and grain. *Triticum aestivum rubrum, spica alba*. Red spring wheat, with a white spike. *Triticum aestivum, spica et grana alba*. Spring wheat, with a white spike and grain.—2. *Triticum hybernum*, winter or common wheat, has also four flowers in a calyx, three of which are mostly productive. The calyces stand on each side a smooth flat receptacle, as in the former species, but they are not quite so far asunder. The leaves of the calyx are bellying, and so smooth that they appear as if polished, but they have no arista. The glumes of the flowers too are smooth, and the outer ones near the top of the spike are often tipped with short aristæ. The grain is rather plumper than the former, and is the sort most generally sown in England; whence the name of *common wheat*. Its varieties are: *Triticum hybernum, spica et grana rubente*. Common wheat, with a red spike and grain. *Triticum hybernum rubrum, spica alba*. Common red wheat, with a white spike. *Triticum hybernum, spica et grana alba*. Common wheat, with a white spike and grain.—3. *Triticum turgidum*, thick spiked or cone-wheat, is easily distinguished from either of the former; for though it has four flowers in a calyx after the manner of them, yet the whole calyx and the edges of the glumes are covered with soft hairs. The calyces too stand thicker on the receptacle, which make the spike appear more turgid. Some of the outer glumes near the top of the spike are terminated by short aristæ, like those of the common wheat. The grain is shorter, plumper, and more convex on the back than either of the former species. Its varieties are numerous, and have various appellations in different counties, owing to the great affinity of several of them. Those most easily to be distinguished are: *Triticum turgidum conicum album*. White cone wheat. *Triticum turgidum conicum rubrum*. Red cone wheat. *Triticum turgidum aristiferum*. Bearded cone wheat. *Triticum turgidum, spica multiplici*. Cone wheat, with many ears. The third variety is what the farmers call *clog wheat*, *square wheat*, and *rovetts*. The grain of this is remarkably convex on one side, and when ripe the awns generally break in pieces and fall off. This sort is very productive, but it yields an inferior flour to what the former two species do.—4. *Triticum Polonicum*, or Polish wheat, has some resemblance to the *turgidum*,

Triticum.

Triton
||
Triumph.

dum, but both grain and spike are longer. The calyx contains only two flowers, and the glumes are furnished with very long aristæ; the teeth of the midrib are bearded. As this sort is seldom sown in England, there is no telling what varieties it produces.—5. *Triticum Spelta*, Spelt or German wheat. At first view this has a great resemblance to barley, but it has no involucre. The calyx is truncated; that is, it appears as if the ends were snipped off, and it contains four flowers, two of which are hermaphrodite and the glumes bearded, but the intermediate ones are neuter. There are two rows of grain as in barley, but they are shaped like wheat. It is much cultivated in France, Germany, and Italy. 6. *Triticum monococcum*, St Peter's corn, or one-grained wheat, has three flowers in each calyx alternately bearded, and the middle one neuter. The spike is shining, and has two rows of grain in the manner of barley. Where it grows naturally is not known, but it is cultivated in Germany; and in conjunction with spelt wheat is there made into bread, which is coarse, and not so nourishing as that made of common wheat. Malt made of any of our wheats is often put into beer, and a small quantity of it will give a large brewing a fine brown transparent tincture.

TRITON, a sea demigod, held by the ancients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders from sea to sea.

TRITURATION, the act of reducing a solid body into a subtile powder; called also *pulverisation* and *levigation*.

TRIUMPH, in Roman antiquity, a public and solemn honour conferred by the Romans on a victorious general by allowing him a magnificent entry in the city.

The greater triumph, called also *curulis*, or simply the *triumph*, was decreed by the senate to a general, upon the conquering of a province or gaining a signal victory. The day appointed for the ceremony being arrived, scaffolds were erected in the forum and circus, and all the other parts of the city where they could best behold the pomp: the senate went to meet the conqueror without the gate called *Capena* or *Triumphalis*, and marched back in order to the Capitol; the ways being cleared and cleansed by a number of officers and tipstaves, who drove away such as thronged the passage or straggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, setting forth his great exploits; his buskins were beset with pearl; and he wore a crown, which at first was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was carried in a magnificent chariot, adorned with ivory and plates of gold, drawn usually by two white horses; though sometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Marc Antony by lions; that of Helio-gabalus by tygers; that of Aurelian by deer, &c. His children were at his feet, and sometimes on the chariot-horses. The procession was led up by the musicians, who played triumphal pieces in praise of the general: these were followed by young men, who led the victims to the sacrifice, with their horns gilded, and their heads adorned with ribbons and garlands; next came the carts and waggons, loaded with all the spoils taken from the enemy, with their horses, chariots, &c.; these were followed by the kings, princes, and generals, who had been taken captives, loaded with chains: after these appeared the triumphal chariot, before which, as it passed, they all along strewed flowers, and the people with loud acclamations called out, *Io triumphe!* The chariot was followed by the senate, clad in white robes; and the senate by such citizens as had been set at liberty or ransomed; and the procession was closed by the priests and their officers and

utensils, with a white ox led along for the chief victim. In this order they proceeded through the triumphal gate, along the via sacra, to the Capitol, where the victims were slain. In the mean time all the temples were open, and all the altars loaded with offerings and incense; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of three persons who govern absolutely, and with equal authority, in a state. It is chiefly applied to the Roman government: Cæsar, Pompey, and Crassus, were the first triumvirs who divided the government among them. There were also other officers so called; as the triumviri or tresviri capitales, who were the keepers of the public gaol: they had the office of punishing malefactors; for which purpose they kept eight lictors under them.

TROAS, a country of Phrygia in Asia Minor, of which Troy was the capital. When Troas is taken for the whole kingdom of Priam, it may be said to contain Mysia and Phrygia Minor; but if only applied to that part of the country where Troy was situated, its extent is confined within very narrow limits. Troas was anciently called Dardania. See TROJA.

TROCHÆUS, in prosody, a foot consisting of a long and short syllable.

TROCHANTER, in anatomy. See there, n° 58.

TROCHE, in pharmacy, a sort of medicine made of glutinous substances into little cakes, and afterwards exsiccated. See PHARMACY, n° 560—569.

TROCHILUS, HUMMING BIRD, a genus of birds belonging to the order of *pica*. The rostrum is subulate, filiform, and longer than the head, the apex being tubular; the upper mandible sheaths the lower. The tongue is filiform and tubulous, the two threads coalescing; the feet are slender and fit for walking; the tail has ten feathers. There are 65 species, none of which are natives of Britain. They are all remarkable for the beauty of their colours, and most of them for the smallness of their size, though some are eight or nine inches in length.—They are divided into two families, viz. those with crooked bills, and those with straight bills. Of these we shall describe the four following species:

1. The *exilis*, or little humming-bird, has a crooked bill, is an inch and a half in length; frequently weighing less than 50 grains. The bill is black, and half an inch in length: the body greenish-brown, with a red, shining, inimitable gloss: the head is crested with a small tuft, green at bottom, but of a sparkling gold colour at top: quills and tail fine black. It is a native of Guiana; and the velocity of it in flying is so great, that the eye can scarce keep pace with its motion.

2. The *moschatus*, or ruby-necked humming-bird, according to Marcgrave is the most beautiful of the whole genus. Its length is three inches four lines; the bill straight, eight lines long, and blackish: the top of the head and hind part of the neck are as bright as a ruby, and of the same colour: the upper parts of the body are brown, with a faint mixture of green and gold: the throat and fore part of the neck are the colour of the most brilliant topaz: the belly, sides, and thighs are brown; but on the lower part of the belly, on each side, is a spot of white: the tail is rufous purple, inclining to violet at the ends; the two middle feathers are shortest: the legs and claws blackish. The female has only a dash of golden or topaz on the breast and fore part of the neck; the rest of the under parts are greyish white. This species is found in Brazil, Curassoa, Guiana, and Surinam.

3. The *minimus*, or least humming-bird, is exceeded, both in weight and dimensions, by several species of bees. The total length is one inch and a quarter; and when killed, weighs

Triumvir
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Trochilus.

Trochilus, weighs no more, according to Sir Hans Sloane, than 20 grains. The bill is straight and black, three lines and a half in length: the upper parts of the head and body are of a greenish gilded brown, in some lights appearing reddish: the under parts are greyish white; the wings are violet-brown; the tail of a bluish black, with a gloss of polished metal; but the outer feather except one on each side, is grey from the middle to the tip, and the outer one wholly grey; legs and claws brown. The female is less than the male: the whole upper side of a dirty brown, with a slight gloss of green; the under parts of a dirty white. These birds are found in various parts of South America and the adjacent islands.—Our author received it from Jamaica.

4. *Superciliosus*, white shaft, or supercilious humming-bird, has a bill twenty lines long; the feathers of the tail next the two long shafts are also the longest, and the lateral ones continually decrease to the two outermost which are the shortest, and this gives the tail a pyramidal shape: its quills have a gold gloss on a grey and blackish ground, with a whitish edge at the point, and the two shafts are white through the whole projecting portions; all the upper side of the back and head gold colour; the wing violet-brown; and the under side of the body white-grey.

These birds subsist on the nectar or sweet juice of flowers: they frequent those most which have a long tube; particularly the *impatiens noli me tangere*, the *monarda* with crimson flowers, and those of the convolvulus tribe. They never settle on the flower during the action of extracting the juice, but flutter continually like bees, moving their wings very quick, and making a humming noise; whence their name. They are not very shy, suffering people to come within a foot or two of the place where they are, but on approaching nearer fly off like an arrow out of a bow. They often meet and fight for the right to a flower, and this all on the wing: in this state they often come into rooms where the windows stand open, fight a little, and go out again. When they come to a flower which is juiceless, or on the point of withering, they pluck it off as it were in anger, by which means the ground is often quite covered with them. When they fly against each other, they have, besides the humming, a sort of chirping noise like a sparrow or chicken. They do not feed on insects nor fruit; nor can they be kept long in cages, though they have been preserved alive for several weeks together by feeding them with water in which sugar had been dissolved.

This bird most frequently builds in the middle of a branch of a tree, and the nest is so small that it cannot be seen by a person who stands on the ground; any one therefore desirous of seeing it, must get up to the branch, that he may view it from above: it is for this reason that the nests are not more frequently found. The nest is of course very small, and quite round: the outside, for the most part, is composed of green moss, common on old pales and trees; the inside of soft down, mostly collected from the leaves of the great mullein, or the silk-grass; but sometimes they vary the texture, making use of flax, hemp, hairs, and other soft materials: they lay two eggs of the size of a pea, which are white, and not bigger at one end than the other.

The above account of the manners will in general suit all the birds of this genus; for as their tongues are made for suction, it is by this method alone that they can gain nourishment: no wonder, therefore, they can scarcely be kept alive by human artifice. Captain Davies, however, informed our author, that he kept these birds alive for four months by the following method:—He made an exact imitation of some of the tubular flowers with paper, fastened round a tobacco-pipe, and painted them of a proper colour; these were placed in the order of nature, in the cage wherein these little

creatures were confined; the bottoms of the tubes were filled with a mixture of brown sugar and water as often as emptied; and he had the pleasure of seeing them perform every action; for they soon grew familiar, and took the nourishment in the same manner as when ranging at large, though close under his eye.

TROGLODYTES, in the ancient geography, a people of Ethiopia, said to have lived in caves under ground. Pomponius Mela gives a strange account of the Troglodytes: he says, they did not so properly speak as shriek; and that they lived on serpents.

TROGUS (Pompeius), Latin universal historian to the time of Augustus Cæsar, of whom we have only an abridgement by Justin, flourished about 41 B. C.

TROJA, the capital city of Troas, or, according to others, a country of which Ilium was the capital. It was built on a small eminence near mount Ida, and the promontory of Sigæum, at the distance of about four miles from the sea-shore. Dardanus the first king of the country built it, and called it *Dardania*, and from Troas one of his successors it was called *Troja*, and from Ilus *Ilium*. This city has been celebrated by the poems of Homer and Virgil; and of all the wars which have been carried on among the ancients, that of Troy is the most famous.

A description of the plan of Troy has been lately published in French in the 3d volume of the Philosophical Transactions of the Royal Society of Edinburgh, written by M. Chevalier. The city of Troy, according to him, stood on the present site of the modern village of Bounarbachi, distant four leagues from the sea, and which is the residence of an Aga, ruling with absolute sway the inhabitants of the Trojan plain and the inferior Agas, to whom they are immediately subject. Bounarbachi is situated on the side of an eminence, exposed to every wind, at the termination of a spacious plain, the soil of which is rich and of a blackish colour. Close to the village is to be seen a marsh covered with tall reeds; and the situation is impregnable on all sides except at Erin (Homer's *ερινος*), the *hill of wild fig trees*, which extended between the Scæan gate and the sources of the Scamander. These circumstances, agreeing with Homer's descriptions, strongly support M. Chevalier's opinion concerning the situation of Troy. A very interesting part of this work is the account of conical mounds or barrows, several of them 100 feet in diameter at the base; and which the author maintains to be the identical tombs raised over the ashes of the heroes of the Trojan war; some of them he deems more ancient. He describes particularly the tombs of Ephyetes, Ilus, Ajax, Hector, Achilles, Patroclus, and Antilochus.

This dissertation, which runs to the length of 92 quarto pages, is replete with erudition and ingenious reasoning, and is illustrated and embellished by maps of the plan of Troy and several tables of inscriptions. It has been translated with much accuracy and care by Mr Dalzel professor of Greek in the University of Edinburgh, and accompanied with large notes and illustrations.

TROLLIUS, GLOBE-FLOWER, or *Lucken Gowen*, in botany: A genus of plants belonging to the class of *polyandria* and order of *polygynia*; and in the natural system ranging under the 26th order, *Multifloræ*. The calyx is wanting; there are about 14 petals; the capsules are very numerous, ovate, and monosperms. There are two species, the asiaticus and europæus; the latter of which is a British plant.

Europæus, or European globe-flower, has its corollets connivent, and from 9 to 16 nectaria, of the length of the stamina, linear, plane, incurvated, and perforated at the inside of the base. The leaves are divided first into five segments down

Troglodytes
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Trollius.

T.omp
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Trouba-
dours.

down to the base; the segments are again divided, each about half way, into two or three lobes, which are sharply indented on the edges. The stalk is a foot high, and scarcely branched: the flower is yellow, globose, and spacious. It grows at the foot of mountains, and by the sides of rivulets. The country people in Sweden strew their floors and pavements on holidays with the flowers, which have a pleasant smell, and are ornamental in gardens.

TROMP (Martin Happertz Van), a celebrated Dutch admiral, was born at the Baille, in Holland. He raised himself by his merit, after having distinguished himself on many occasions, especially at the famous engagement near Gibraltar in 1607. He passed for one of the greatest seamen that had till that time appeared in the world; and was declared admiral of Holland, even by the advice of the prince of Orange. He in that character defeated a large Spanish fleet in 1630, and gained 32 other victories at sea; but was killed when under deck, in an engagement with the English in 1653. The states-general caused medals to be struck to his honour, and lamented him as one of the greatest heroes of their republic. Van Tromp, in the midst of the greatest glory, constantly discovered a remarkable modesty; for he never assumed a higher character than that of a burgher, and that of being the father of the sailors.

TRONAGE, an ancient customary duty or toll, for weighing of wool. According to Fleta, *trona* is a beam to weigh with, mentioned in the stat. Westm. 2. cap. 25. And tronage was used for the weighing wool in a staple or public mart, by a common trona or beam; which, for the tronage of wool in London, was fixed at Leaden-Hall. The mayor and commonalty of London are ordained keepers of the beams and weights for weighing merchants commodities, with power to assign clerks and porters, &c. of the great beam and balance; which weighing of goods and wares is called *tronage*; and no stranger shall buy any goods in London before they are weighed at the king's beam, on pain of forfeiture.

TRONE-WEIGHT, the most ancient of the different weights used in Scotland; and, though now forbidden by several statutes, is still used by many for home-commodities, and that in a very irregular manner; for the pound varies in different places, and for different purposes, from 20 to 24 Dutch ounces. The common allowance is $21\frac{1}{2}$ oz. for wool, $20\frac{1}{2}$ for butter and cheese, 20 for tallow, lint, hemp, and hay. It is divided into 16 of its own ounces, and 16 pounds make a stone.

TROOP, a small body of horse or dragoons, about 50 or 60, sometimes more, sometimes less, commanded by a captain, lieutenant, cornet, quarter-master, and three corporals, who are the lowest officers of a troop.

TROPE. See ORATORY, n° 52—66.

TROPHONIUS CAVE, or *Oracle* (anc. geog.), a cave near Lebadia in Bœotia, between Helicon and Chæroneia (Strabo): so called from Trophonius, an enthusiastic diviner; who, descending into this cave, pretended to give answers and pronounce oracles; and was hence called *Jupiter Trophonius*. Such as went down to this cave never after smiled; hence the proverbial saying of a man who has lost his mirth, 'That he is come out of Trophonius's cave.' Though Pausanias, who writes from experience, contradicts this; affirming that persons came out of the cave affected indeed with a stupor, but that they soon after recovered themselves. See ORACLE.

TROPHY (*Tropaum*), among the ancients, a monument of victory.

TROPIC-BIRD. See PHÆTON.

TROPICS. See GEOGRAPHY, n° 40.

TROUBADOURS, poets that flourished in Provence during the 12th century.

They wrote poems on love and gallantry; on the illustrious characters and remarkable events of the times; satires which were chiefly directed against the clergy and monks; and a few didactic pieces. The troubadours were great favourites in different courts, diffused a taste for their language and for poetry over Europe, which was about that time sunk in ignorance and rudeness; they disappeared in the 14th century. A history of the troubadours in 3 volumes 12mo, was begun by M. de Sainte Palaise, and finished by the Abbé Millot. See MUSIC, n° 23.

TROVER, in law, an action that a man hath against one that, having found any of his goods, refuseth to deliver them upon demand.

TROUT. See SALMO.

TROY. See TROJA.

TROY-Weight, one of the most ancient of the different kinds used in Britain. The ounce of this weight was brought from Grand Cairo in Egypt, about the time of the crusades, into Europe, and first adopted in *Troyes* a city of Champagne; whence the name.

The pound *English Troy* contains 12 ounces, or 5760 grains. It was formerly used for every purpose; and is still retained for weighing gold, silver, and jewels; for compounding medicines; for experiments in natural philosophy; and for comparing different weights with each other.

Scots *Troy-Weight* was established by James VI. in the year 1618, who enacted, that only one weight should be used in Scotland, viz. the French Troy stone of 16 pounds, and 16 ounces in the pound. The pound contains 7600 grains, and is equal to 17 oz. 6 dr. avoirdupois. The cwt. or 112 lb. avoirdupois, contains only 103 lb. $2\frac{1}{2}$ oz. of this weight, though generally reckoned equal to 104 lb. This weight is nearly, if not exactly, the same as that of Paris and Amsterdam; and is generally known by the name of *Dutch weight*. Though prohibited by the articles of union, it is still used in weighing iron, hemp, flax, most Dutch and Baltic goods, meal, butcher-meat, unwrought pewter and lead, and some other articles.

TRUE-LOVE, in botany. See PARIS.

TRUFFLES. See LYCOPERDON.

TRUMPET, a musical instrument, the most noble of all portable ones of the wind kind; used chiefly in war, among the cavalry to direct them in the service. Each troop of cavalry has one. The cords of the trumpets are of crimson, mixed with the colours of the facings of the regiments.

As to the invention of the trumpet, some Greek historians ascribe it to the Tyrrhenians; but others, with greater probability, to the Egyptians; from whom it might have been transmitted to the Israelites. The trumpet was not in use among the Greeks at the time of the Trojan war; though it was in common use in the time of Homer. According to Potter (*Arch. Græc.* vol. ii. cap. 9.), before the invention of trumpets, the first signals of battle in primitive wars were lighted torches; to these succeeded shells of fishes, which were sounded like trumpets. And when the trumpet became common in military use, it may well be imagined to have served at first only as a rough and noisy signal of battle, like that at present in Abyssinia and New Zealand, and perhaps with only one sound. But, even when more notes were produced from it, so noisy an instrument must have been an unfit accompaniment for the voice and poetry; so that it is probable the trumpet was the first solo instrument in use among the ancients.

TRUMPET, *articulate*, comprehends both the *speaking* and the *hearing* trumpet, is by much the most valuable instrument, and has, in one of its forms, been used by people among whom we should hardly have expected to find such improvements.

That the *speaking trumpet*, of which the object is to increase the

Trover
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Trumpet.

Trumpet. the force of articulate sounds, should have been known to the ancient Greeks, can excite no wonder; and therefore we easily admit the accounts which we read of the horn or trumpet, with which Alexander addressed his army, as well as of the whispering caverns of the Syracusan tyrant. But that the natives of Peru were acquainted with this instrument, will probably surprise many of our readers. The fact however seems incontrovertible.

In the History of the Order of Jesuits, published at Naples in 1601 by Beritania, it is said, that in the year 1595 a small convent of that order in Peru, situated in a remote corner, was in danger of immediate destruction by famine. One evening the superior Father Samaniac, implored the help of the cacique; next morning, on opening the gate of the monastery, he found it surrounded by a number of women, each of whom carried a small basket of provisions. He returned thanks to heaven for having miraculously interposed, by inspiring the good people with pity for the distress of his friars. But when he expressed to them his wonder how they came all to be moved as if by mutual agreement with these benevolent sentiments, they told him it was no such thing; that they looked on him and his countrymen as a pack of infernal magicians, who by their sorceries had enslaved the country, and had bewitched their good cacique, who hitherto had treated them with kindness and attention, as became a true worshipper of the sun; but that the preceding evening at sunset he had ordered the inhabitants of such and such villages, about six miles off, to come that morning with provisions to this nest of wizzards.

The superior asked them in what manner the governor had warned so many of them in so short a time, at such a distance from his own residence? They told him that it was by the trumpet; and that every person heard at their own door the distinct terms of the order. The father had heard nothing; but they told him that none heard the trumpet but the inhabitants of villages to which it was directed. This is a piece of very curious information; but, after allowing a good deal to the exaggeration of the reverend Jesuits, it cannot, we think, be doubted, but that the Peruvians actually possessed this stentorophonic art. For we may observe that the effect described in this narration resembles what we now know to be the effect of speaking trumpets, while it is unlike what the inventor of such a tale would naturally and ignorantly say. Till speaking trumpets were really known, we should expect the sound to be equally diffused on all sides, which is not the case; for it is much stronger in the line of the trumpet than in any direction very oblique to it.

About the middle of the last century, Athanasius Kircher turned his attention to the philosophy of sound, and in different works threw out many useful and scientific hints on the construction of speaking trumpets (see *ACOUSTICS* and *KIRCHER*); but his mathematical illustrations were so vague, and his own character of inattention and credulity so notorious, that for some time these works did not attract the notice to which they were well intitled.

About the 1670 Sir Samuel Morland, a gentleman of great ingenuity, science, and order, took up the subject, and proposed as a question to the Royal Society of London, What is the best form for a speaking trumpet? which he called a stentorophonic horn. He accompanied his demand with an account of his own notions on the subject (which he acknowledged to be very vague and conjectural), and an exhibition of some instruments constructed according to his views. They were in general very large conical tubes, sud-

denly spreading at the very mouth to a greater width. Their effect was really wonderful. They were tried in St James's park; and his Majesty K. Charles II. speaking in his ordinary colloquial pitch of voice through a trumpet only $5\frac{1}{2}$ feet long, was clearly and most distinctly heard at the distance of a thousand yards. Another person, selected we suppose for the loudness and distinctness of his voice, was perfectly understood at the distance of four miles and a half. The fame of this soon spread; Sir Samuel Morland's principles were refined, considering the novelty of the thing, and differ considerably from father Kircher's. The aerial undulations (for he speaks very accurately concerning the nature of sound) endeavour to diffuse themselves in spheres, but are stopped by the tube, and therefore redundate towards the axis like waves from a bank, and, meeting in the axis, they form a strong undulation a little farther advanced along the tube, which again spreads, is again reflected, and so on, till it arrives at the mouth of the tube greatly magnified, and then it is diffused through the open air in the same manner, as if all proceeded from a very sonorous point in the centre of the wide end of the trumpet. The author distinguishes with great judgment between the prodigious reinforcement of sound in a speaking trumpet and that in the musical trumpet, bugle-horn, conch-shell, &c.; and shows that the difference consists only in the violence of the first sonorous agitation, which can be produced by us only on a very small extent of surface. The mouth-piece diameter therefore of the musical trumpet must be very small, and the force of blast very considerable. Thus one strong but simple undulation will be excited, which must be subjected to the modifications of harmony, and will be augmented by using a conical tube (A). But a speaking trumpet must make no change on the nature of the first undulations; and each point of the mouth-piece must be equally considered as the centre of sonorous undulations, all of which must be reinforced in the same degree, otherwise all distinctness of articulation will be lost. The mouth-piece must therefore take in the whole of of the mouth of the speaker.

When Sir Samuel Morland's trumpet came to be generally known on the continent, it was soon discovered that the speaker could be heard at a great distance only in the line of the trumpet; and this circumstance was by a Mr Cassegrain (*Journ. des Sçavans* 1672, p. 131.) attributed to a defect in the principle of its construction, which he said was not according to the laws of sonorous undulations. He proposed a conoid formed by the revolution of a hyperbola round its asymptote as the best form. A Mr Hase of Wirtemberg, on the other hand, proposed a parabolic conoid, having the mouth of the speaker placed in the focus. In this construction he plainly went on the principle of a reflection similar to that of the rays of light; but this is by no means the case. The effect of the parabola will be to give one reflection, and in this all the circular undulations will be converted into plane waves, which are at right angles to the axis of the trumpet. But nothing hinders their subsequent diffusion; for it does not appear that the sound will be enforced, because the agitation of the particles on each wave is not augmented.

The subject is exceedingly difficult. We do not fully comprehend on what circumstance the affection or agitation of our organ, or simply of the membrana tympani, depends. A more violent agitation of the same air, that is, a wider oscillation of its particles, cannot fail to increase the impulse on this membrane. The point therefore is to find what concourse

(A) Accordingly the sound of the bugle-horn, of the musical trumpet, or the French horn, is prodigiously loud, when we consider the small passage through which a moderate blast is sent by the trumpeter.

Trumpet. concourse of feeble undulations will produce or be equivalent to a great one. The reasonings of all these restorers of the speaking trumpet are almost equally specious, and each point out some phenomenon which should characterise the principle of construction, and thus enable us to say which is most agreeable to the procedure of nature.—Yet there is hardly any difference in the performance of trumpets of equal dimensions made after these different methods.

The propagation of light and of elastic undulations seem to require very different methods of management. Yet the ordinary phenomena of echoes are perfectly explicable by the acknowledged laws either of optics or acoustics; still however there are some phenomena of sound which are very unlike the genuine results of elastic undulations. If sounds are propagated spherically, then what comes into a room by a small hole should diffuse itself from that hole as round a centre, and it should be heard equally well at twelve feet distance from the hole in every direction. Yet it is very sensibly louder when the hearer is in the straight line drawn from the sonorous body through the hole. A person can judge of the direction of the sounding body with tolerable exactness. Cannon discharged from the different sides of a ship are very easily distinguished, which should not be the case by the Newtonian theory; for in this the two pulses on the ear should have no sensible difference.

The most important fact for our purpose is this: An echo from a small plane surface in the midst of an open field is not heard, unless we stand in such a situation that the angle of reflected sound may be equal to that of incidence. But by the usual theory of undulations, this small surface should become the centre of a new undulation, which should spread in all directions. If we make an analogous experiment on watery undulations, by placing a small flat surface so as to project a little above the water, and then drop in a small pebble at a distance, so as to raise one circular wave, we shall observe, that when this wave arrives at the projecting plane, it is disturbed by it, and this disturbance spreads from it on all sides. It is indeed sensibly stronger in that line which is drawn from it at equal angles with the line drawn to the place where the pebble was dropped. But in the case of sound, it is a fact, that if we go to a very small distance on either side of the line of reflection, we shall hear nothing.

Here then is a fact, that whatever may be the nature of the elastic undulations, sounds are reflected from a small plane in the same manner as light. We may avail ourselves of this fact as a mean for enforcing sound, though we cannot explain it in a satisfactory manner. We should expect from it an effect similar to the hearing of the original sound, along with another original sound coming from the place from which this reflected sound diverges. If therefore the reflected sound or echo arrives at the ear in the same instant with the original sound, the effect will be doubled; or at least it will be the same with two simultaneous original sounds. Now we know that this is in some sense equivalent to a stronger sound. For it is a fact, that a number of voices uttering the same or equal sounds are heard at a much greater distance than a single voice. We cannot perhaps explain how this happens by mechanical laws, nor assign the exact proportion in which 10 voices exceed the effect of one voice; nor the proportion of the distances at which they seem equally loud. We may therefore, for the present, suppose that two equal voices at the same distance are twice as loud, three voices three times as loud, &c. Therefore if, by means of a speaking trumpet, we can make 10 equal echoes arrive at the ear at the same moment, we may suppose its effect to be to increase the audibility 10 times;

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and we may express this shortly, by calling the sound 10 *Trumpet.* times louder or more intense.

But we cannot do this precisely. We cannot by any contrivance make the sound of a momentary snap, and those of its echoes, arrive at the ear in the same moment, because they come from different distances. But if the original noise be a continued sound, a man's voice, for example, uttering a continued uniform tone, the first echo may reach the ear at the same moment with the second vibration of the larynx; the second echo along with the third vibration, and so on. It is evident, that this will produce the same effect. The only difference will be, that the articulations of the voice will be made indistinct, if the echoes come from very different distances. Thus if a man pronounce the syllable *raw*, and the 10 successive echoes are made from places which are 10 feet farther off, the 10th part of a second (nearly) will intervene between hearing the first and the last. This will give it the sound of the syllable *thaw*, or perhaps *raw*, because *r* is the repetition of *t*. Something like this occurs when, standing at one end of a long line of soldiers, we hear the muskets of the whole line discharged in one instant. It seems to us the sound of a runningfire.

The aim therefore in the construction of a speaking trumpet may be, to cause as many echoes as possible to reach a distant ear without any perceptible interval of time. This will give distinctness, and something equivalent to loudness. Pure loudness arises from the violence of the single aerial undulation. To increase this may be the aim in the construction of a trumpet; but we are not sufficiently acquainted with the mechanism of these undulations to bring this about with certainty and precision; whereas we can procure this accumulation of echoes without much trouble, since we know that echoes are, *in fact*, reflected like light. We can form a trumpet so that many of these lines of reflected sound shall pass through the place of the hearer. We are indebted to Mr Lambert of Berlin for this simple and popular view of the subject; and shall here give an abstract of his most ingenious Dissertation on Acoustic Instruments, published in the Berlin Memoirs for 1763.

Sound naturally spreads in all directions; but we know that echoes or reflected sounds proceed almost strictly in certain limited directions. If therefore we contrive a trumpet in such a way that the lines of echo shall be confined within a certain space, it is reasonable to suppose that the sound will become more audible in proportion as this diffusion is prevented. Therefore if we can oblige a sound which, in the open air, would have diffused itself over a hemisphere, to keep within a cone of 120 degrees, we should expect it to be twice as audible within this cone. This will be accomplished, by making the reflections such that the lines of reflected sound shall be confined within this cone. *N. B.* We here suppose that nothing is lost in the reflection. Let us examine the effect of a cylindrical trumpet.

Let the trumpet be a cylinder ABED (fig. 1.), and let C be a sounding point in the axis. It is evident that all the sound in the cone BCE will go forward without any reflection. Let CM be any other line of sound, which we may, for brevity's sake, call a *sonorous* or *phonic* line. Being reflected in the points M, N, O, P, it is evident that it will at last escape from the trumpet in a direction PQ, equally diverging from the axis with the line CM. The same must be true of every other sonorous line. Therefore the echoes will all diverge from the mouth of the trumpet in the same manner as they would have proceeded from C without any trumpet. Even supposing, therefore, that the echoes are as strong as the original sound, no advantage is gained by such a trumpet, but that of bringing the sound forward

Plate
D&H.

Trumpet. from C to c. This is quite trifling when the hearer is at a distance. Yet we see that sounds may be heard at a very great distance, at the end of long, narrow, cylindrical, or prismatic galleries. It is known that a voice may be distinctly heard at the distance of several hundred feet in the Roman aqueducts, whose sides are perfectly straight and smooth, being plastered with stucco. The smooth surface of the still water greatly contributes to this effect. Cylindrical or prismatic trumpets must therefore be rejected.

Let the trumpet be a cone BCA (fig. 2.), of which CN is the axis, DK a line perpendicular to the axis, and DFHI the path of a reflected sound in the plane of the axis. The last angle of reflection IHA is equal to the last angle of incidence FHC. The angle BFH, or its equal CFD, is equal to the angles FHD and FCH; that is, the angle of incidence CFD exceeds the next angle of incidence FHC by the angle FCD; that is, by the angle of the cone. In like manner, FDH exceeds CFD by the same angle FCD. Thus every succeeding angle, either of incidence or reflection, exceeds the next by the angle of the cone. Call the angle of the cone a , and let b be the first angle of incidence PDC. The second, or DFC, is $b - a$. The third, or FHC, is $b - 2a$, &c.: and the n th angle of incidence or reflection is $b - na$, after n reflections. Since the angle diminishes by equal quantities at each subsequent reflection, it is plain, that whatever be the first angle of incidence, it may be exhausted by this diminution; namely, when n times a exceeds or is equal to b . Therefore to know how many reflections of a sound, whose first incidence has the inclination b , can be made in an infinitely extended cone, whose angle is a , divide b by a ; the quotient will give the number n of reflections, and the remainder, if any, will be the last angle of incidence or reflection less than a . It is very plain, that when an angle of reflection IHA is equal to or less than the angle BCA of the cone, the reflected line HI will no more meet with the other side CB of the cone.

We may here observe, that the greatest angle of incidence is a right angle, or 90° . This sound would be reflected back in the same line, and would be incident on the opposite side in an angle $= 90^\circ - a$, &c.

Thus we see that a conical trumpet is well suited for confining the sound: for by prolonging it sufficiently, we can keep the lines of reflected sound wholly within the cone. And when it is not carried to such a length as to do this, when it allows the sounding line GH, for example, to escape without farther reflection, the divergency from the axis is less than the last angle of reflection BGH by half the angle BCA of the cone. Let us see what is the connection between the length and the angle of ultimate reflection.

We have $\sin. b - a : \sin. b = CD : CF$, and $CF = CD \times \frac{\sin. b}{\sin. b - a}$, and $\sin. b - 2a : \sin. b - a = CF : CH$, and $CH = CF \times \frac{\sin. b - a}{\sin. b - 2a} = CD \times \frac{\sin. b}{\sin. b - a} \times \frac{\sin. b - a}{\sin. b - 2a}$, $= CD \times \frac{\sin. b}{\sin. b - 2a}$, &c.

Therefore if we suppose X to be the length which will give us n reflections, we shall have $X = CD \times \frac{\sin. b}{\sin. b - na}$.

Hence we see that the length increases as the angle $b - na$ diminishes; but is not infinite, unless na is equal to b . In this case, the immediately preceding angle of reflection must be a , because these angles have the common difference a . Therefore the last reflected sound was moving parallel to the opposite side of the cone, and cannot again meet it. But though we cannot assign the length which will give the n th

reflection, we can give the length which will give the one Trumpet immediately preceding, whose angle with the side of the cone is a . Let Y be this length. We have $Y = CD \times \frac{\sin. b}{\sin. a}$.

This length will allow every line of sound to be reflected as often, saving once, as if the tube were infinitely long. For suppose a sonorous line to be traced backwards, as if a sound entered the tube in the direction ib , and were reflected in the points b, f, d, i, D , the angles will be continually augmented by the constant angle a . But this augmentation can never go farther than $90^\circ + \frac{1}{2}a$. For if it reaches that value at D , for instance, the reflected line DK will be perpendicular to the axis CN; and the angle ADK will be equal to the angle DKB, and the sound will come out again. This remark is of importance on another account.

Now suppose the cone to be cut off at D by a plane perpendicular to the axis, KD will be the diameter of its mouth-piece; and if we suppose a mouth completely occupying this circle, and every point of the circle to be sonorous, the reflected sounds will proceed from it in the same manner as light would from a flame which completely occupies its area, and is reflected by the inside of the cone. The angle FDA will have the greatest possible sine when it is a right angle, and it never can be greater than ADK, which is $= 90^\circ + \frac{1}{2}a$. And since between $90^\circ + \frac{1}{2}a$, and $90^\circ - \frac{1}{2}a$, there must fall some multiple of a ; call this multiple b . Then, in order that every sound may be reflected as often as possible, saving once, we must make the length of it $X =$

$$CD \times \frac{S, b}{S, a}$$

Now since the angle of the cone is never made very great, never exceeding 10 or 12 degrees, b can never differ from 90 above a degree or two, and its sine cannot differ much from unity. Therefore X will be very nearly equal to $\frac{CD}{S, a}$,

which is also very nearly equal to $\frac{CD}{2 S, \frac{1}{2}a}$; because a is small, and the sines of small arches are nearly equal and proportional to the arches themselves. There is even a small compensation of errors in this formula. For as the sine of 90° is somewhat too large, which would give X too great, $2 S, \frac{1}{2}a$ is also larger than the sine of a . Thus let a be 12° : then the nearest multiple of a is 84 or 96° , both of which are as far removed as possible from 90° , and the error is as great as possible, and is nearly $\frac{1}{180}$ th of the whole.

This approximation gives us a very simple construction. Let CM be the required length of the trumpet, and draw ML perpendicular to the axis in O. It is evident that $S,$

$MCO : \text{rad.} = MO : CM$, and CM ; or $X = \frac{MO}{S, \frac{1}{2}a} = \frac{LM}{2 S, \frac{1}{2}a}$, but $X = \frac{CD}{2 S, \frac{1}{2}a}$, and therefore LM is equal to CD.

If therefore the cone be of such a length, that its diameter at the mouth is equal to the length of the part cut off, every line of sound will have at least as many reflections, save one, as if the cone were infinitely long; and the last reflected line will either be parallel to the opposite side of the cone, or lie nearer the axis than this parallel; consequently such a cone will confine all the reflected sounds within a cone whose angle is $2a$, and will augment the sound in the proportion of the spherical base of this cone to a complete hemispherical surface. Describe the circle DKT round C, and making DT an arch of 90° , draw the chord DT. Then since the circles described with the radii DK,

Trumpet. DK, DT, are equal to the spherical surfaces generated by the revolution of the arches DK and DKT round the axis CD, the sound will be condensed in the proportion of DK^2 to DT^2 .

This appears to be the best general rule for constructing the instrument; for, to procure another reflection, the tube must be prodigiously lengthened, and we cannot suppose that one reflection more will add greatly to its power.

It appears, too, that the length depends chiefly on the angle of the cone; for the mouth-piece may be considered as nearly a fixed quantity. It must be of a size to admit the mouth when speaking with force and without constraint. About an inch and a half may be fixed on for its diameter. When therefore we propose to confine the sound to a cone of twice the angle of the trumpet, the whole is determined by that angle. For since in this case LM is equal to CD, we have $DK : CD = LM$ (or CD) : CM and $CM = CD^2$.

DK.

But $2S, \frac{1}{2}a : 1 = DK : CD$,

and $2S, \frac{1}{2}a : 1 = CD : CM$;

therefore $4S, \frac{1}{2}a : 1 = DK : CM$,

And $CM = \frac{DK}{4S, \frac{1}{2}a} = \frac{DK}{S, \frac{1}{2}a}$ very nearly. And since DK is an inch and a half, we get the length in inches, counted from the apex of the cone $= \frac{1}{S, \frac{1}{2}a}$, or $\frac{3}{2S, \frac{1}{2}a}$. From

this we must cut off the part CD, which is $= \frac{DK}{S, \frac{1}{2}a}$, or

very nearly $\frac{DK}{S, \frac{1}{2}a}$, or $\frac{3}{2S, \frac{1}{2}a}$, measured in inches, and we

must make the mouth of the same width $\frac{3}{2S, \frac{1}{2}a}$.

On the other hand, if the length of the trumpet is fixed on, we can determine the angle of the cone. For let the length (reckoned from C) be L; we have $2S, \frac{1}{2}a = \frac{3}{L}$,

or $S, \frac{1}{2}a = \frac{3}{2L}$, and $S, a = \sqrt{\frac{3}{2L}}$.

Thus let 6 feet or 72 inches be chosen for the length of the cone, we have $S, a = \sqrt{\frac{3}{144}} = \sqrt{\frac{1}{48}} = 0,14434$, $= \sin 8^\circ 17'$ for the angle of the cone; and the width at the mouth is $\frac{3}{2S, \frac{1}{2}a} = 10,4$ inches. This being taken from 72, leaves 61,6 inches for the length of the trumpet.

And since this trumpet confines the reflected sounds to a cone of $16^\circ 34'$, we have its magnifying power $= \frac{DT^2}{DK^2}$,

$= \frac{\frac{1}{4}DT^2}{\frac{1}{4}DK^2} = \frac{S, \frac{1}{2}45^\circ}{S, \frac{1}{2}8^\circ} = 96$ nearly. It therefore condenses the sound about 96 times; and if the distribution were uniform, it would be heard $\sqrt{96}$, or nearly 10 times farther off. For the loudness of sounds is supposed to be inversely as the square of the distance from the centre of undulation.

But before we can pronounce with precision on the performance of a speaking trumpet, we must examine into the manner in which the reflected sounds are distributed over the space in which they are all confined.

Let BKDA (fig. 3.) be the section of a conical trumpet by a plane through the axis; let C be the vertex of the cone, and CW its axis; let TKV be the section of a sphere, having its centre in the vertex of the cone; and let P be a sonorous point on the surface of the sphere, and

Passel the path of a line of sound lying in the plane of the section.

In the great circle of the sphere take $KQ = KP$, $DR = DQ$, and $KS = KR$. Draw QBb ; also draw Qdn parallel to DA; and draw PB, Pd, PA.

1. Then it is evident that all the lines drawn from P, within the cone APB, proceed without reflection, and are diffused as if no trumpet had been used.

2. All the sonorous lines which fall from P on KB are reflected from it as if they had come from Q.

3. All the sonorous lines between BP and dP have suffered but one reflection; for dn will no more meet DAA' so as to be reflected again.

4. All the lines which have been reflected from KB, and afterwards from DA, proceed as if they had come from R. For the lines reflected from KB proceed as if they had come from Q; and lines coming from Q and reflected by DA, proceed as if they had come from R. Therefore draw RAo , and also draw Rgm parallel to KB, and draw $QcAq$, Qbg , Pc , and Pb . Then,

5. All the lines between bP and cP have been twice reflected.

Again, draw SBp , BrR , ruQ , $Sx A$, Ryx , Qzy .

6. All the lines between uP and zP have suffered three reflections.

Draw the tangents $TA t$, $VB v$, crossing the axis in W.

7. The whole sounds will be propagated within the cone vWt. For to every sonorous point in the line KD there corresponds a point similar to Q, regulating the first reflection from KB; and a point similar to R, regulating the second reflection from DA; and a point S regulating the third reflection from KB, &c. And similar points will be found regulating the first reflection from DA, the second from KB, and the third from DA, &c.; and lines drawn from all these through A and B must lie within the tangents TA and VB.

8. Thus the centres of reflection of all the sonorous lines which lie in planes passing through the axis, will be found in the surface of this sphere; and it may be considered as a sonorous sphere, whose sounds first concentrate in W, and are then diffused in the cone vWt.

It may be demonstrated nearly in the same manner, that the sonorous lines which proceed from P, but not in the plane passing through the axis, also proceed, after various reflections, as if they had come from points in the surface of the same sphere. The only difference in the demonstration is, that the centres Q, R, S of the successive reflections are not in one plane, but in a spiral line winding round the surface of the sphere according to fixed laws. The foregoing conclusions are therefore general for all the sounds which come in all directions from every point in the area of the mouth-piece.

Thus it appears, that a conical trumpet is well fitted for increasing the force of sounds by diminishing their final divergence. For had the speaker's mouth been in the open air, the sounds which are now confined within the cone vWt would have been diffused over a hemisphere: and we see that prolonging the trumpet must confine the sounds still more, because this will make the angle BWA still smaller; a longer tube must also occasion more reflections, and consequently send more sonorous undulations to the ear at a distance placed within the cone vWt.

We have now obtained a very connected view of the whole effect of a conical trumpet. It is the same as if the whole segment TKDV were sounding, every part of it with an intensity proportional to the density of the points Q, R, S, &c. corresponding to the different points P of the mouth-piece. It is easy to see that this cannot be uniform, but

Trumpet. must be much rarer towards the margin of the segment. It would require a good deal of discussion to show the density of these fictitious sounding points; and we shall content ourselves with giving a very palpable view of the distribution of the sonorous rays, or the density (so to speak) of the echoes, in the different situations in which a hearer may be placed.

Fig. 3.

We may observe, in the mean time, that this substitution of a sounding sphere for the sounding mouth piece has an exact parallel in *Optics*, by which it will be greatly illustrated. Suppose the cone BKDA to be a tube polished in the inside, fixed in a wall B α , perforated in BA, and that the mouth-piece DK is occupied completely by a flat flame. The effect of this on a spectator will be the same if he is properly placed in the axis, as if he were looking at a flame as big as the whole sphere. This is very evident.

It is easy to see that the line *les* is equal to the line *les* P; therefore the reflected sounds also come to the ear in the same moments as if they had come from their respective points on the surface of the substituted sphere. Unless, therefore, this sphere be enormously large, the distinctness of articulation will not be sensibly affected, because the interval between the arrival of the different echoes of the same snap will be insensible.

Our limits oblige us to content ourselves with exhibiting this evident similarity of the progress of echo from the surface of this phonic sphere, to the progress of light from the same luminous sphere shining through a hole of which the diameter is AB. The direct investigation of the intensity of the sound in different directions and distances would take up much room, and give no clearer conception of the thing. The intensity of the sound in any point is precisely similar to the intensity of the illumination of the same point; and this is proportional to the portion of the luminous surface seen from this point through the hole directly, and to the square of the distance inversely. The intelligent reader will acquire a distinct conception of this matter from fig. 4. which represents the distribution of the sonorous lines, and by consequence the degree of loudness which may be expected in the different situations of the hearer.

As we have already observed, the effect of the cone of the trumpet is perfectly analogous to the reflection of light from a polished concave, conical mirror. Such an instrument would be equally fitted for illuminating a distant object. We imagine that these would be much more powerful than the spherical or even parabolic mirrors commonly used for this purpose. These last, having the candle in the focus, also send forward a cylinder of light of equal width with the mirror. But it is well known, that oblique reflections are prodigiously more vivid than those made at greater angles. Where the inclination of the reflected light to the plane of the mirror does not exceed eight or ten degrees, it reflects about three-fourths of the light which falls on it. But when the inclination is 80, it does not reflect one-fourth part.

We may also observe, that the density of the reflected sounds by the conical trumpet ABC (fig. 4.) is precisely similar to that of the illumination produced by a luminous sphere TDV, shining through a hole AB. There will be a space circumscribed by the cone formed by the lines TB α and VA ν , which is uniformly illuminated by the whole sphere (or rather by the segment TDV), and on each side there is a space illuminated by a part of it only, and the illumination gradually decreases towards the borders. A spectator placed much out of the axis, and looking through

the hole AB, may not see the whole sphere. In like manner, he will not hear the whole sounding sphere: He may be so far from the axis as neither to see nor hear any part of it.

Assisting our imagination by this comparison, we perceive that beyond the point *w* there is no place where *all* the reflected sounds are heard. Therefore, in order to preserve the magnifying power of the trumpet at any distance, it is necessary to make the mouth as wide as the sonorous sphere. Nay, even this would be an imperfect instrument, because its power would be confined to a very narrow space; and if it be not accurately pointed to the person listening, its power will be greatly diminished. And we may observe, by the way, that we derive from this circumstance a strong confirmation of the justness of Mr Lambert's principles; for the effects of speaking trumpets are really observed to be limited in the way here described.—Parabolic trumpets have been made, and they fortify the sound not only in the cylindrical space in the direction of the axis, but also on each side of it, which should not have been the case had their effect depended only on the undulations formed by the parabola in planes perpendicular to the axis. But to proceed.

Let BCA (fig. 5.) be the cone, ED the mouth-piece, TEDV the equivalent sonorous sphere, and TBAV the circumscribed cylinder. Then CA or CB is the length of cone that is necessary for maintaining the magnifying power at all distances. We have two conditions to be fulfilled. The diameter ED of the mouth-piece must be of a certain fixed magnitude, and the diameter AB of the outer end must be equal to that of the equivalent sonorous sphere. These conditions determine all the dimensions of the trumpet and its magnifying power. And, first, with respect to the dimensions of the trumpet.

The similarity of the triangles ECG and BCF gives $CG : ED = CF : AB$; but $CG = BF = \frac{1}{2} AB$, and $CF = CG + GF = GF + \frac{1}{2} AB$; therefore $\frac{1}{2} AB : ED = GF + \frac{1}{2} AB : AB$, and $AB : ED = 2GF + AB : AB$; therefore $2GF \times ED + AB \times ED = AB^2$, and $2GF \times ED = AB^2 - AB \times ED = AB \times AB - ED$, and $GF = \frac{AB \times AB - ED}{2 ED}$. And, on the other hand, because

$AB^2 - AB \times ED = 2GF \times ED$, we have $AB^2 - AB \times ED + \frac{1}{4} ED^2 = 2GF \times ED + \frac{1}{4} ED^2$, or $AB - \frac{1}{2} ED^2 = 2GF \times ED + \frac{1}{4} ED^2$, and $AB = \sqrt{2GF \times ED + \frac{1}{4} ED^2} + \frac{1}{2} ED$.

Let *x* represent the length of the trumpet, *y* the diameter at the great end, and *m* the diameter of the mouth-piece.

Then $x = \frac{y \times y - m^2}{2m}$, and $y = \sqrt{2xm + \frac{1}{4}m^2} + \frac{1}{2}m$. Thus

the length and the great diameter may be had reciprocally. The useful case in practice is to find the diameter for a proposed length, which is gotten by the last equation.

Now if we take all the dimensions in inches, and fix *m* at an inch and a half, we have $2xm = 3x$, and $\frac{1}{4}m^2 = 0,5625$, and $\frac{1}{2}m = 0,75$; so that our equation becomes $y = \sqrt{3x + 0,5625} + 0,75$. The following table gives the dimensions of a sufficient variety of trumpets. The first column is the length of the trumpet in feet; the second column is the diameter of the mouth in inches; the third column is the number of times that it magnifies the sound; and the fourth column is the number of times that it increases the distance at which a man may be distinctly heard by its means; the fifth contains the angle of the cone.

GF

Trumpet.

GF feet.	AB inches.	Magnifying.	Extending	ACB.
1	6,8	42,6	6,5	24.53
2	9,3	77,8	8,8	18.23
3	11,2	112,4	10,6	15.18
4	12,8	146,6	12,1	13.24
5	14,2	180,4	13,4	12.04
6	15,5	214,2	14,6	11.05
7	16,6	247,7	15,7	10.18
8	17,7	281,3	16,8	9.40
9	18,8	314,6	17,7	9.08
10	19,8	347,7	18,6	8.42
11	20,7	380,9	19,5	8.18
12	21,5	414,6	20,4	7.58
13	22,1	513,6	22,7	7.09
18	26,2	612,3	24,7	6.33
21	28,3	711,2	26,6	6.05
24	30,2	810,1	28,5	5.42
ED in all is = 1,5.				

The two last columns are constructed on the following considerations: We conceive the hearer placed within the cylindrical space whose diameter is B.A. In this situation he receives an echo coming apparently from the whole surface TGV; and we account the effect of the trumpet as equivalent to the united voices of as many mouths as would cover this surface. Therefore the quotient obtained by dividing the surface of the hemisphere by that of the mouth-piece will express the magnifying power of the trumpet. If the chords gE , gT , be drawn, we know that the spherical surfaces TgV , EgD , are respectively equal to the circles described with the radii Tg , Eg , and are therefore as Tg^2 and Eg^2 . Therefore the audibility of the trumpet, when compared with a single voice, may be expressed by $\frac{Tg^2}{Eg^2}$. Now the ratio of Tg^2 to Eg^2 is easily obtained. For if Ef be drawn parallel to the axis, it is plain that $Bf = \frac{BA - ED}{2}$, and that Ef is to fB as radius to the tangent of BCF; which angle we may call a . Therefore $\tan. a = \frac{y - m}{2x}$, and thus we obtain the angle a . But if the radius CE be accounted 1, Tg is $= \sqrt{2}$, and Eg is $= 2 \sin. \frac{a}{2}$. Therefore $\frac{Tg}{Eg} = \frac{\sqrt{2}}{2 \sin. \frac{a}{2}}$, and the magnifying power of the trumpet is $= \frac{2}{4 \sin.^2 \frac{a}{2}} = \frac{1}{2 \sin.^2 \frac{a}{2}}$. The numbers, therefore, in the third column of the table are each $= \frac{1}{2 \sin.^2 \frac{a}{2}}$.

But the more usual way of conceiving the power of the trumpet is, by considering how much farther it will enable us to hear a voice equally well. Now we suppose that the audibility of sounds varies in the inverse duplicate ratio of the distance. Therefore if the distance d , at which a man may be distinctly heard, be increased to z , in the proportion of EG to Tg , the sound will be less audible, in the proportion of Tg^2 to EG^2 . Therefore the trumpet will be as well heard at the distance z as the simple voice is heard at the distance a . Therefore $\frac{z}{a}$ will express the ex-

tending power of the trumpet, which is therefore $= \frac{\sqrt{2}}{2 \sin. \frac{a}{2}}$. Trumpet.

In this manner were the numbers computed for the fourth column of the table.

When the angle BCA is small, which is always the case in speaking trumpets, we may, without any sensible error, consider EG as $= \frac{ED}{2} = \frac{m}{2}$. And $TG = TC \times \sqrt{2} = \frac{AB}{2} \sqrt{2} = \frac{AB}{\sqrt{2}} = \frac{y}{\sqrt{2}}$. This gives a very easy computation of the extending and magnifying powers of the trumpet.

The extending power is $= \sqrt{2} \frac{y}{m}$.

The magnifying power is $= 2 \frac{y^2}{m^2}$.

We may also easily deduce from the premises, that if the mouth-piece be an inch and a half in diameter, and the length x be measured in inches, the extending power is very nearly $= \sqrt{\frac{8}{3}x}$ and the magnifying power $= \frac{8}{3}x$.

An inconvenience still attends the trumpet of this construction. Its complete audibility is confined to the cylindrical space in the direction of the axis, and it is more faintly heard on each side of it. This obliges us to direct the trumpet very exactly to the spot where we wish it to be heard. This is confirmed by all the accounts we have of the performance of great speaking trumpets. It is evident, that by lengthening the trumpet, and therefore enlarging its mouth, we make the lines TB and VA expand (fig. 4.); and therefore it will not be so difficult to direct the trumpet.

But even this is confined within the limits of a few degrees. Even if the trumpet were continued without end, the sounds cannot be reinforced in a wider space than the cone of the trumpet. But it is always advantageous to increase its length; for this makes the extreme tangents embrace a greater portion of the sonorous sphere, and thus increases the sound in the space where it is all reflected. And the limiting tangents TB , VA , expand still more, and thus the space of full effect is increased. But either of these augmentations is very small in comparison of the augmentation of size. If the trumpet of fig. 5. were made an hundred times longer, its power would not be increased one half.

We need not therefore aim at much more than to produce a cylindrical space of full effect; and this will always be done by the preceding rules, or table of constructions. We may give the trumpet a third or a fourth part more length, in order to spread a little the space of its full effect, and thereby make it more easily directed to the intended object. But in doing this we must be careful to increase the diameter of the mouth as much as we increase the length; otherwise we produce the very opposite effect, and make the trumpet greatly inferior to a shorter one, at all distances beyond a certain point. For by increasing the length while the part CG remains the same, we cause the tangents TB and VA to meet on some distant point, beyond which the sound diffuses prodigiously. The construction of a speaking trumpet is therefore a problem of some nicety; and as the trials are always made at some considerable distance, it may frequently happen that a trumpet, which is not heard at a mile's distance, may be made very audible two miles off by cutting off a piece at its wide end.

After this minute consideration of the conical trumpet, we might proceed to consider those of other forms. In particular, the hyperbolic, proposed by Cassegrain, and the parabolic,

Trumpet. parabolic, proposed by Haase, seem to merit consideration. But if we examine them merely as reflectors of echoes, we shall find them inferior to the conical.

With respect to the hyperbolic trumpet, its inaptitude is evident at first sight. For it must dissipate the echoes more than a conical trumpet. Indeed Mr Cassegrain proceeds on quite different principles, depending on the mechanism of the aerial undulations: his aim was to increase the agitation in each pulse, so that it may make a more forcible impulse on the ear. But we are too imperfectly acquainted with this subject to decide *a priori*; and experience shows that the hyperbola is not a good form.

With respect to the parabolic trumpet, it is certain that if the mouth-piece were but a point, it would produce the most favourable reflection of all the sounds; for they would all proceed parallel to the axis. But every point of an open mouth must be considered as a centre of sound, and none of it must be kept out of the trumpet. If this be all admitted, it will be found that a conical trumpet, made by the preceding rules, will dissipate the reflected sounds much less than the parabolic.

Thus far have we proceeded on the fair consequences of the well known fact, that echoes are reflected in the same manner as light, without engaging in the intricate investigation of aerial undulations. Whoever considers the Newtonian theory of the propagation of sound with intelligence and attention, will see that it is demonstrated solely in the case of a single row of particles; and that all the general corollaries respecting the lateral diffusion of the elastic undulations are little more than sagacious guesses, every way worthy of the illustrious author, and beautifully confirmed by what we can most distinctly and accurately observe in the circular waves on the surface of still water. But they are by no means fit for becoming the foundation of any doctrine which lays the smallest claim to the title of accurate science. We really know exceedingly little of the theory of aerial undulations; and the conformity of the phenomena of sound to these guesses of Sir Isaac Newton has always been a matter of wonder to every eminent and candid mathematician: and no other should pretend to judge of the matter. This wonder has always been acknowledged by Daniel Bernoulli; and he is the only person who has made any addition to the science of sounds that is worth mentioning. For such we must always esteem his doctrine of the secondary undulations of musical cords, and the secondary pulses of air in pipes. Nothing therefore is more unwarrantable, or more plainly shows the precipitant presumption of modern sciolists, than the familiar use of the general theory of aerial undulations in their attempts to explain the abstruse phenomena of nature (such as the communication of sensation from the organ to the sensorium by the vibrations of a nervous fluid, the reciprocal communication of the volitions from the sensorium to the muscle, nay, the whole phenomena of mind), by vibrations and vibratiunculae.

Such attempts equally betray ignorance, presumption, and meanness of soul. Ignorance of the extent to which the Newtonian theory may be logically carried, is the necessary consequence of ignorance of the theory itself. It is presumption to apply it to the phenomena of the intellectual world; and surely he has an abject soul who hugs and cherishes the humble thought, that his mind is an undulating fluid, and that its all-grasping comprehension, and all its delightful emotions, are nothing more than an ethereal tune. — “*Pol me occidistis amentes.*” This whim is older than Hartley: It may be found in Robinet’s *Système de la Nature*. This by the by made its first appearance as a discourse delivered by Brother Orateur in the lodge of the grand Orient at Lyons; from which source have proceeded

all the cosmopolitical societies in Europe, and that illumination by which reason is to triumph over revelation, and liberty and equality over civil government. We crave pardon of our readers for this ebullition of spleen; and we hope for it from all those who can read Newton, and who esteem his modesty.

Those who have endeavoured to improve the speaking trumpet on mechanical principles, have generally aimed at increasing the violence of the elastic undulations, that they may make a more forcible impulse on the ear. This is the object in view in the parabolic trumpet. All the undulations are converted into others which are in planes perpendicular to the axis of the instrument; so that the same little mass of air is agitated again and again in the same direction. From this it is obvious to conclude, that the total agitation will be more violent. But, in the first place, these violent agitations must diffuse themselves laterally as soon as they get out of the trumpet, and thus be weakened, in a proportion that is perhaps impossible for the most expert analyst to determine. But, moreover, we are not sufficiently acquainted with the mechanism of the very first agitations, to be able to perceive what conformation of the trumpet will cause the reflected undulations to increase the first undulations, or to check them. For it must happen, during the production of a continued sound in a trumpet, that a parcel of air, which is in a state of progressive agitation, as it makes a pulse of one sound, may be in a state of retrograde agitation, as it is part of a pulse of air producing another sound. We cannot (at least no mathematician has yet done it) discriminate, and then combine these agitations, with the intelligence and precision that are necessary for enabling us to say what is the ultimate accumulated effect. Mr Lambert therefore did wisely in abstaining from this intricate investigation; and we are highly obliged to him for deducing such a body of demonstrable doctrine from the acknowledged, but ill understood, fact of the reflection of echoes.

We know that two sounds actually cross each other without any mutual disturbance; for we can hear either of them distinctly, provided the other is not so loud as to stun our ears, in the same manner as the glare of the sun dazzles our eyes. We may therefore depend on all the consequences which are legitimately deduced from this fact, in the same manner as we depend on the science of catoptrics, which is all deduced from a fact perfectly similar and as little understood.

But the preceding propositions by no means explain or comprehend all the reinforcement of sound which is really obtained by means of a speaking trumpet. In the first place, although we cannot tell in what degree the aerial undulations are increased, we cannot doubt that the reflections which are made in directions which do not greatly deviate from the axis, do really increase the agitation of the particles of air. We see a thing perfectly similar to this in the waves on water. Take a long slip of lead, about two inches broad, and having bent it into the form of a parabola, set it into a large flat trough, in which the water is about an inch deep. Let a quick succession of small drops of water fall precisely on the focus of the parabola. We shall see the circular waves proceeding from the focus all converted into waves perpendicular to the axis; and we shall frequently see these straight waves considerably augmented in their height and force. We say generally, for we have sometimes observed that these reflected waves were not sensibly stronger than the circular or original waves. We do not exactly know to what this difference must be ascribed; we are disposed to attribute it to the frequency of the drops. This may be such, that the interval of time between each drop is precisely equal, or at least commensurable, to the time

Trumpet.

Trumpet time in which the waves run over their own breadth. This is a pretty experiment; and the ingenious mechanician may make others of the same kind which will greatly illustrate several difficult points in the science of sounds. We may conclude, in general, that the reflection of sounds, in a trumpet of the usual shapes, is accompanied by a real increase of the aerial agitations; and in some particular cases we find the sounds prodigiously increased. Thus, when we blow through a musical trumpet, and allow the air to take that uniform undulation which can be best maintained in it, namely, that which produces its musical tone, where the whole tube contains but one or two undulations, the agitation of a particle must then be very great; and it must describe a very considerable line in its oscillations. When we suit our blast in such a manner as to continue this note, that is, this undulation, we are certain that the subsequent agitations conspire with the preceding agitation, and augment it. And accordingly we find that the sound is increased to a prodigious degree. A cor de chasse, or a bugle horn, when properly winded, will almost deafen the ear; and yet the exertion is a mere nothing in comparison with what we make when bellowing with all our force, but with not the tenth part of the noise. We also know, that if we speak through a speaking trumpet in the key which corresponds with its dimensions, it is much more audible than when we speak in a different pitch. These observations show, that the loudness of a speaking trumpet arises from something more than the sole reflection of echoes considered by Mr Lambert—the very echoes are rendered louder.

In the next place, the sounds are increased by the vibrations of the trumpet itself. The elastic matter of the trumpet is thrown into tremors by the undulations which proceed from the mouth-piece. These tremors produce pulses in the contiguous air, both in the inside of the trumpet and on that which surrounds it. These undulations within the trumpet produce original sounds, which are added to the reflected sounds: for the tremor continues for some little time, perhaps the time of three or four or more pulses. This must increase the loudness of the subsequent pulses. We cannot say to what degree, because we do not know the force of the tremor which the part of the trumpet acquires: but we know that these sounds will not be magnified by the trumpet to the same degree as if they had come from the mouth-piece; for they are reflected as if they had come from the surface of a sphere which passes through the agitated point of the trumpet. In short, they are magnified only by that part of the trumpet which lies without them. The whole sounds of this kind, therefore, proceed as if they came from a number of concentric spherical surfaces, or from a solid sphere, whose diameter is twice the length of the trumpet cone.

All these agitations arising from the tremors of the trumpet tend greatly to hurt the distinctness of articulation; because, coming from different points of a large sphere, they arrive at the ear in a sensible succession; and thus change a momentary articulation to a lengthened sound, and give the appearance of a number of voices uttering the same words in succession. It is in this way that, when we clap our hands together near a long rail, we get an echo from each post, which produces a chirping sound of some continuance. For these reasons it is found advantageous to check all tremors of the trumpet by wrapping it up in woollen lifts. This is also necessary in the musical trumpet.

With respect to the undulations produced by the tremors of the trumpet in the air contiguous to its outside, they also hurt the articulation. At any rate, this is so much of the sonorous momentum uselessly employed; be-

cause they are diffused like common sounds, and receive Trumpet no augmentation from the trumpet.

It is evident, that this instrument may be used (and ac-^{Hearing} cordingly was so) for aiding the hearing; for the sonorous trumpet. lines are reflected in either direction. We know that all tapering cavities greatly increase external noises; and we observe the brutes prick up their ears when they want to hear uncertain or faint sounds. They turn them in such directions as are best suited for the reflection of the sound from the quarter whence the animal imagines that it comes.

Let us apply Mr Lambert's principle to this very interesting case, and examine whether it be possible to assist dull hearing in like manner as the optician has assisted imperfect sight.

The subject is greatly simplified by the circumstances of the case; for the sounds to which we listen generally come in nearly one direction, and all that we have to do is to produce a condensation of them. And we may conclude, that the audibility will be proportional to this condensation.

Therefore let ACB, fig. 6. be the cone, and CD its axis. The sound may be conceived as coming in the direction RA, parallel to the axis, and to be reflected in the points A, b, c, d, e, till the angle of incidence increases to 90°; after which the subsequent reflections send the sound out again. We must therefore cut off a part of the cone; and, because the lines increase their angle of incidence at each reflection, it will be proper to make the angle of the cone an aliquot part of 90°, that the least incidence may amount precisely to that quantity. What part of the cone should be cut off may be determined by the former principles.

Call the angle ACD, a . We have $Ce = \frac{CA \cdot \sin. a}{\sin. (2n+1)a}$ when the sound gets the last useful reflection. Then we have the diameter of the mouth $AB = 2 CA \cdot \sin. a$, and that of the other end $ef = Ce \cdot 2 \sin. a$. Therefore the sounds will be condensed in the ratio of CA^2 to Ce^2 , and the trumpet will bring the speaker nearer in the ratio of CA to Ce .

When the lines of reflected sound are thus brought together, they may be received into a small pipe perfectly cylindrical, which may be inserted into the external ear. This will not change their angles of inclination to the axis nor their density. It may be convenient to make the internal diameter of this pipe $\frac{1}{2}$ of an inch. Therefore $Ce \cdot \sin. a$ is $= \frac{1}{2}$ of an inch. This circumstance, in conjunction with the magnifying power proposed, determines the other dimensions of the hearing trumpet. For $Ce = \frac{1}{6 \sin. a} =$

$$\frac{CA \cdot \sin. a}{\sin. (2n+1)a}, \text{ and } CA = \frac{\sin. (2n+1)a}{6 \sin.^2 a}.$$

Thus the relation of the angle of the cone and the length of the instrument is ascertained, and the sound is brought nearer in the ratio of CA to Ce , or of $\sin. (2n+1)a$ to $\sin. a$. And seeing that we found it proper to make $(2n+1)a = 90^\circ$, we obtain this very simple analogy, $1 : \sin. a = CA : Ce$. And the sine of $\frac{1}{2}$ the angle of the cone is to radius as 1 to the approximating power of the instrument.

Thus let it be required that the sound may be as audible as if the voice were 12 times nearer. This gives $\frac{CA}{Ce} = 12$,

This gives $\sin. a = \frac{1}{12}$, and $a = 4^\circ 47'$, and the angle of the cone $= 9.34$. Then $CA = \frac{1}{6 \sin.^2 a} = \frac{1}{6 \cdot \frac{1}{144}} = \frac{144}{6} = 24$. Therefore the length of the cone is 24 inches. From this

Trumpet. this take $Ce = \frac{CA}{12} = 2$, and the length of the trumpet is 22 inches. The diameter at the mouth is $2Ce = 4$ inches. With this instrument one voice should be as loud as 144.

If it were required to approximate the sound only four times, making it 16 times stronger than the natural voice at the same distance, the angle ACB must be 29° ; Ae must be 2 inches, AB must be $1\frac{1}{2}d$ inches, and ef must be $\frac{1}{3}d$ of an inch.

It is easy to see, that when the size of the ear-end is the same in all, the diameters at the outer end are proportional to the approximating powers, and the length of the cones are proportional to the magnifying powers.

We shall find the parabolic conoid the preferable shape for an acoustic trumpet; because the sounds come into the instrument in a direction parallel to the axis, they are reflected so as to pass through the focus. The parabolic conoid must therefore be cut off through the focus, that the sounds may not go out again by the subsequent reflections; and they must be received into a cylindrical pipe of $\frac{1}{4}d$ of an inch in diameter. Therefore the parameter of this parabola is $\frac{1}{8}th$ of an inch, and the focus is $\frac{1}{16}th$ of an inch from the vertex. This determines the whole instrument; for they are all portions of one parabolic conoid. Suppose that the instrument is required to approximate the sound 12 times, as in the example of the conical instrument. The ordinate at the mouth must be 12 times the 6th of an inch, or 2 inches; and the mouth diameter is 4 inches, as in the conical instrument. Then, for the length, observe, that DC in fig. 7. is $\frac{1}{8}th$ of an inch, and MP is 2 inches, and AC is $\frac{1}{16}th$ of an inch, and $DC^2 : MP^2 = AC : AP$. This will give $AP = 12$ inches, and $CP = 11\frac{1}{4}ths$; whereas in the conical tube it was 22. In like manner an instrument which approximates the sounds 4 times, is only $1\frac{1}{4}d$ inches long, and $1\frac{1}{2}d$ inches diameter at the big end. Such small instruments may be very exactly made in the parabolic form, and are certainly preferable to the conical. But since even these are of a very moderate size when intended to approximate the sound only a few times, and as they can be accurately made by any tin-man, they may be of more general use. One of 12 inches long, and 5 inches wide at the big end, should approximate the sound at least 9 times.

A general rule for making them.—Let m express the approximating power intended for the instrument. The length of the instrument in inches is $\frac{m \times m - 1}{6}$, and the diameter

at the mouth is $\frac{m}{3}$. The diameter at the small end is always $\frac{1}{3}d$ of an inch.

In trumpets for assisting the hearing all reverberation of the trumpet must be avoided. It must be made thick, of the least elastic materials, and covered with cloth externally. For all reverberation lasts for a short time, and produces new sounds which mix with those that are coming in.

We must also observe, that no acoustic trumpet can separate those sounds to which we listen from others that are made in the same direction. All are received by it, and magnified in the same proportion. This is frequently a very great inconvenience.

There is also another imperfection, which we imagine cannot be removed, namely, an odd confusion, which cannot be called indistinctness, but a feeling as if we were in the midst of an echoing room. The cause seems to be this: Hearing gives us some perception of the direction of the sounding object, not indeed very precise, but sufficiently

so for most purposes. In all instruments which we have described for dissipating sounds, the last reflections are made in directions very much inclined to the axis, and inclined in many different degrees. Therefore they have the appearance of coming from different quarters; and instead of the perception of a single speaker, we have that of a sounding surface of great extent. We do not know any method of preventing this, and at the same time increasing the sound.

There is an observation which it is of importance to make on this theory of acoustic instruments. Their performance does not seem to correspond to the computations founded on the theory. When they are tried, we cannot think that they magnify so much: Indeed it is not easy to find a measure by which we can estimate the degrees of audibility. When a man speaks to us at the distance of a yard, and then at the distance of two yards, we can hardly think that there is any difference in the loudness; though theory says, that it is four times less in the last of the two experiments; and we cannot but adhere to the theory in this very simple case, and must attribute the difference to the impossibility of measuring the loudness of sounds with precision. And because we are familiarly acquainted with the sound, we can no more think it four times less at twice the distance, than we can think the visible appearance of a man four times less when he is at a quadruple distance. Yet we can completely convince ourselves of this, by observing that he covers the appearance of four men at that distance. We cannot easily make the same experiment with voices.

But, besides this, we have compared two hearing trumpets, one of which should have made a sound as audible at the distance of 40 feet as the other did at 10 feet distance; but we thought them equal at the distance of 40 and 18. The result was the same in many trials made by different persons, and in different circumstances. This leads us to suspect some mistake in Mr Lambert's principle of calculation; and we think him mistaken in the manner of estimating the intensity of the reflected sounds. He conceives the proportion of intensity of the simple voice and of the trumpet to be the same with that of the surface of the mouth-piece to the surface of the sonorous hemisphere, which he has so ingeniously substituted for the trumpet. But this seems to suppose, that the whole surface, generated by the revolution of the quadrantal arch TEG round the axis CG (fig. 4.), is equally sonorous. We are assured that it is not: For even if we should suppose that each of the points Q, R, and S (fig. 3.), are equally sonorous with the point P, these points of reflection do not stand so dense on the surface of the sphere as on the surface of the mouth-piece. Suppose them arranged at equal distances all over the mouth-piece, they will be at equal distances also on the sphere, only in the direction of the arches of great circles which pass through the centre of the mouth-piece. But in the direction perpendicular to this, in the circumference of small circles, having the centre of the mouth-piece for their pole, they must be rarer in the proportion of the sine of their distance from this pole. This is certainly the case with respect to all such sounds as have been reflected in the planes which pass through the axis of the trumpet; and we do not see (for we have not examined this point) that any compensation is made by the reflection which is not in planes passing through the axis. We therefore imagine, that the trumpet does not increase the sound in the proportion of gE^2 to gT^2 (fig. 5.), but in that of $\frac{gE^2}{GE}$ to $\frac{gT^2}{CT}$.

Mr Lambert seems aware of some error in his calculation, and proposes another, which leads nearly to this conclusion, but

Fig. 1.

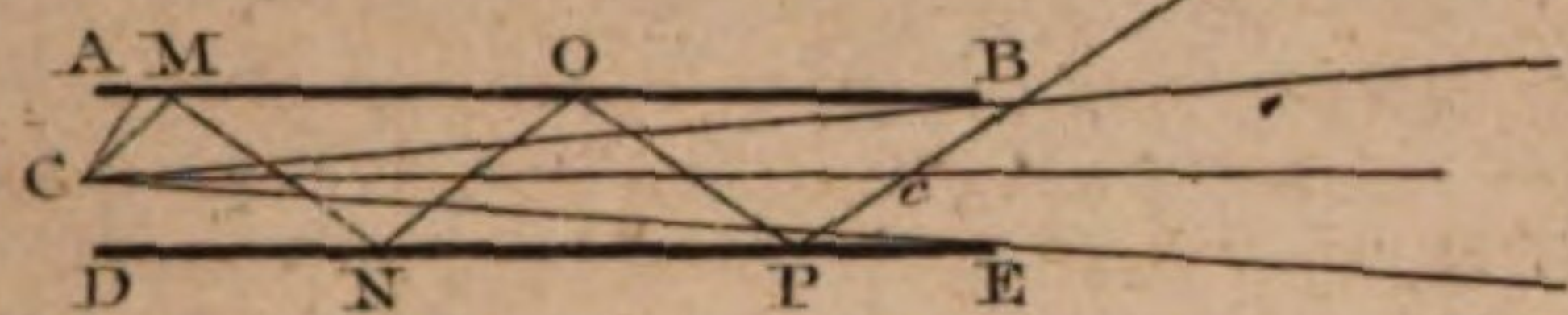


Fig. 2.

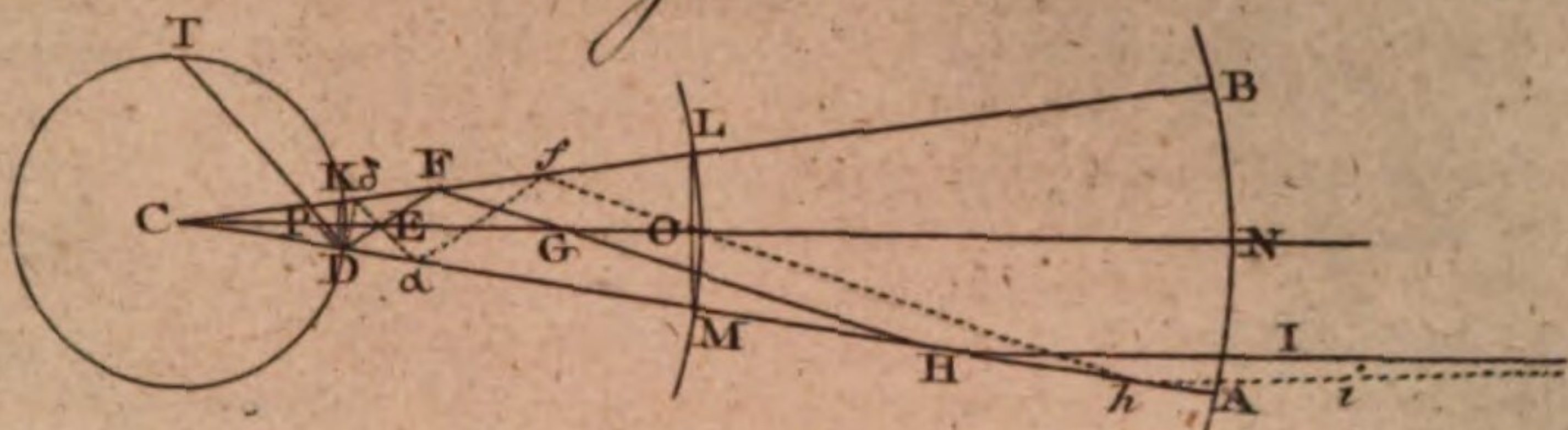


Fig. 3.

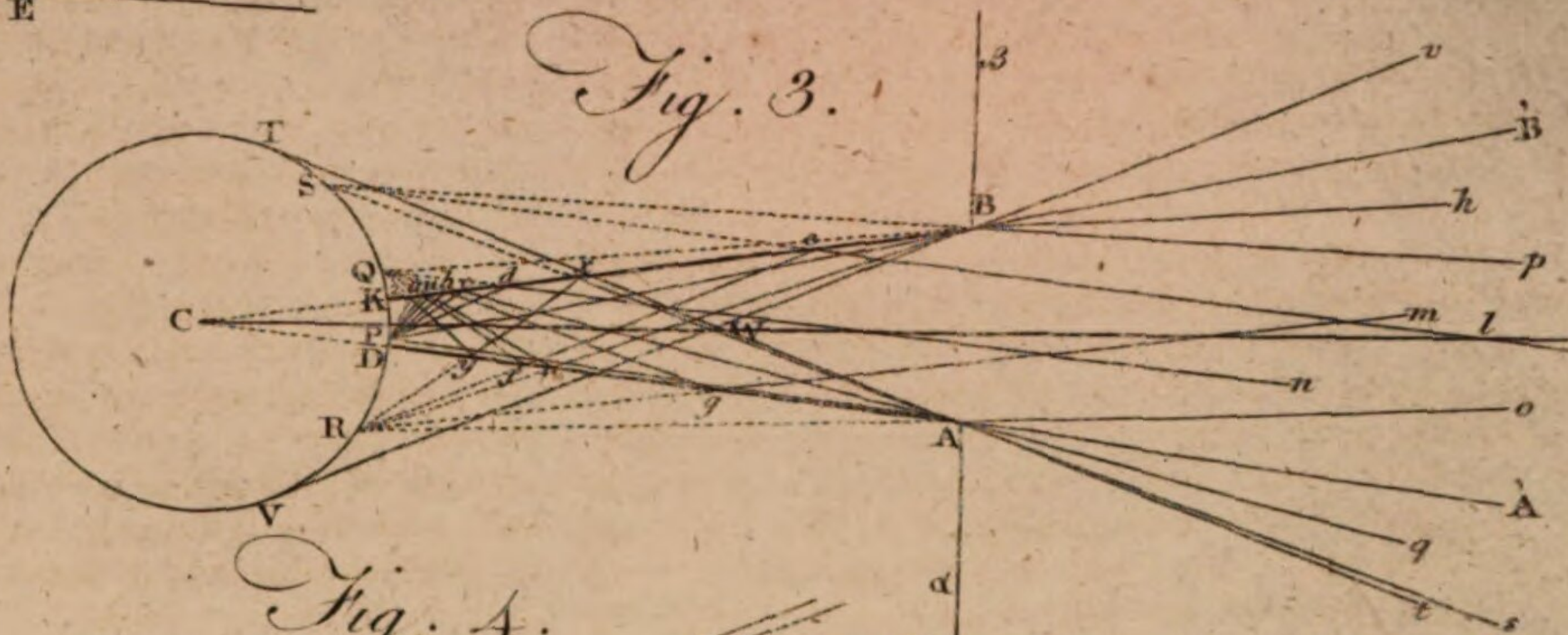


Fig. 4.

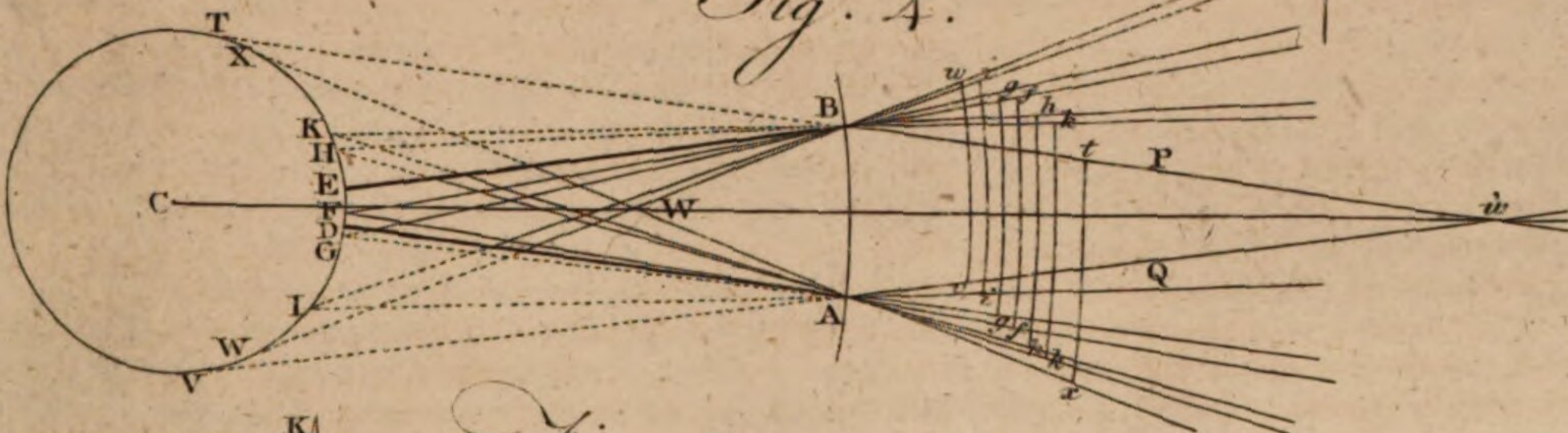


Fig. 5.

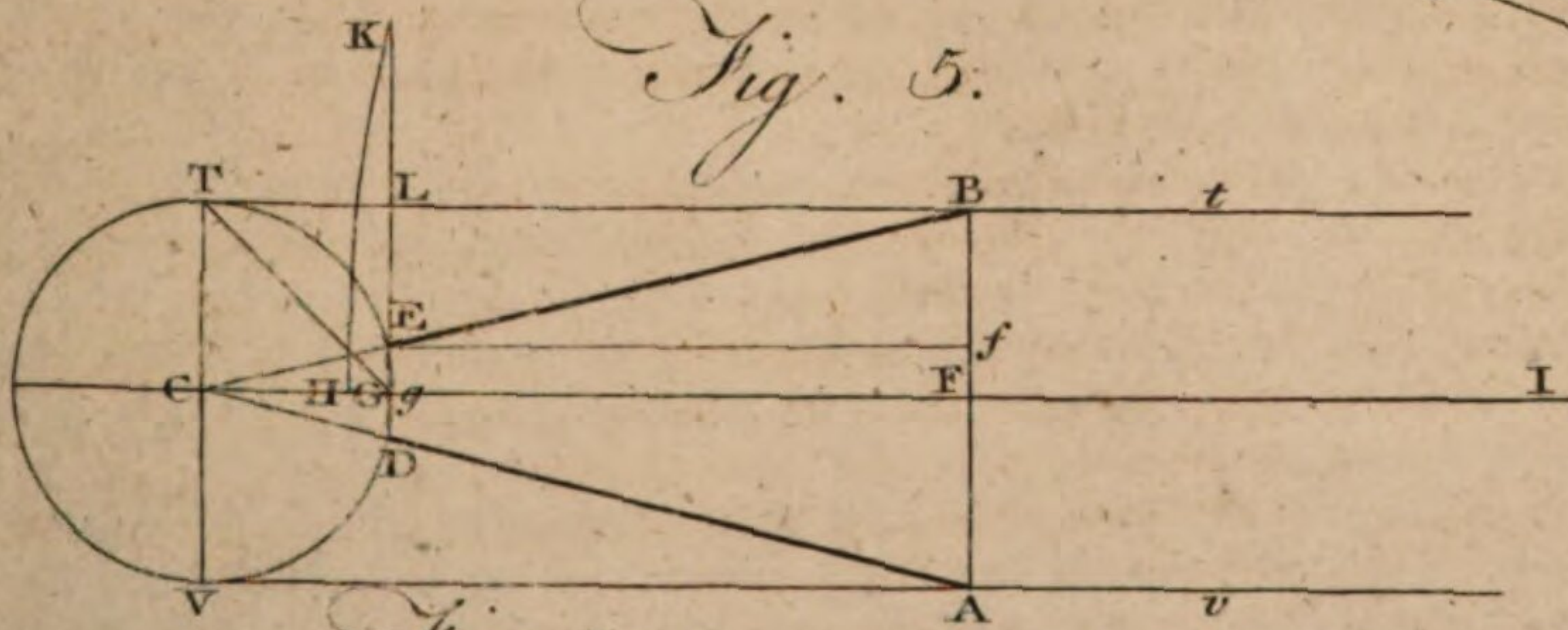


Fig. 7. M

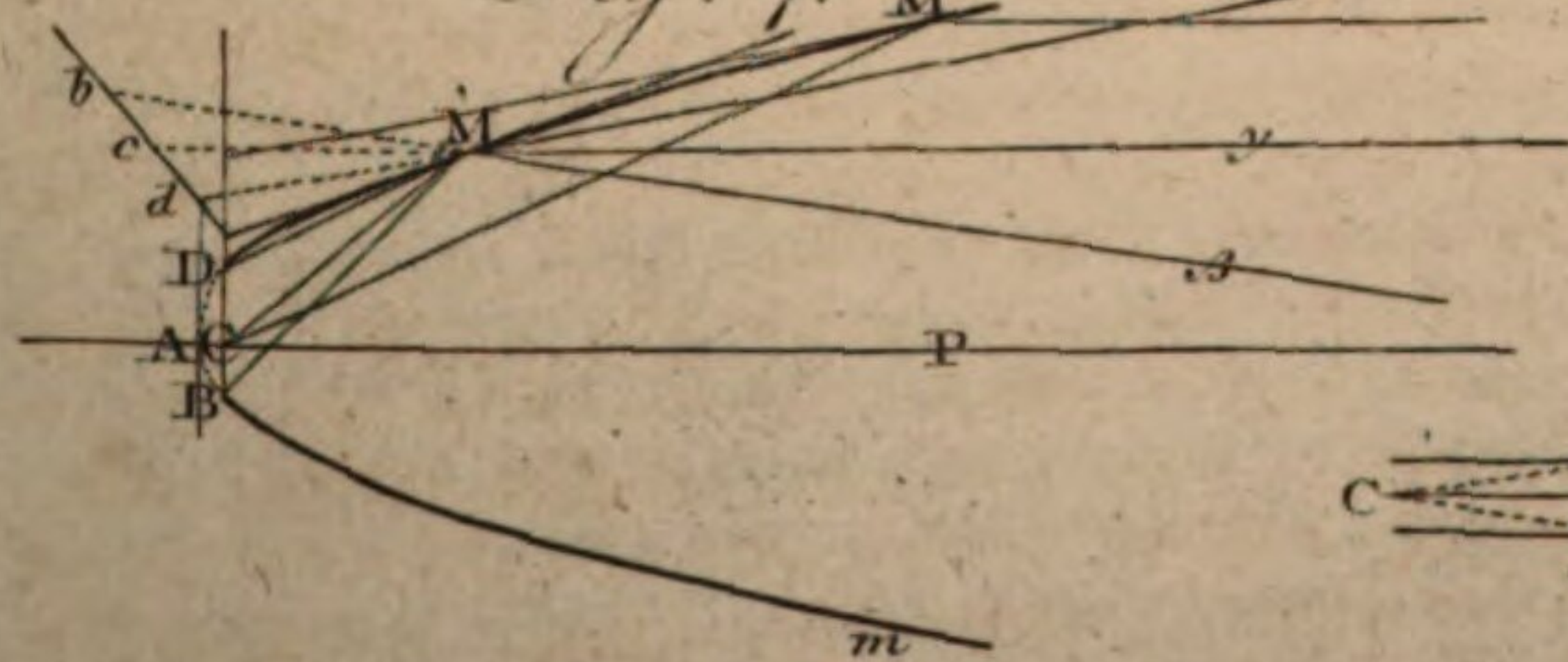
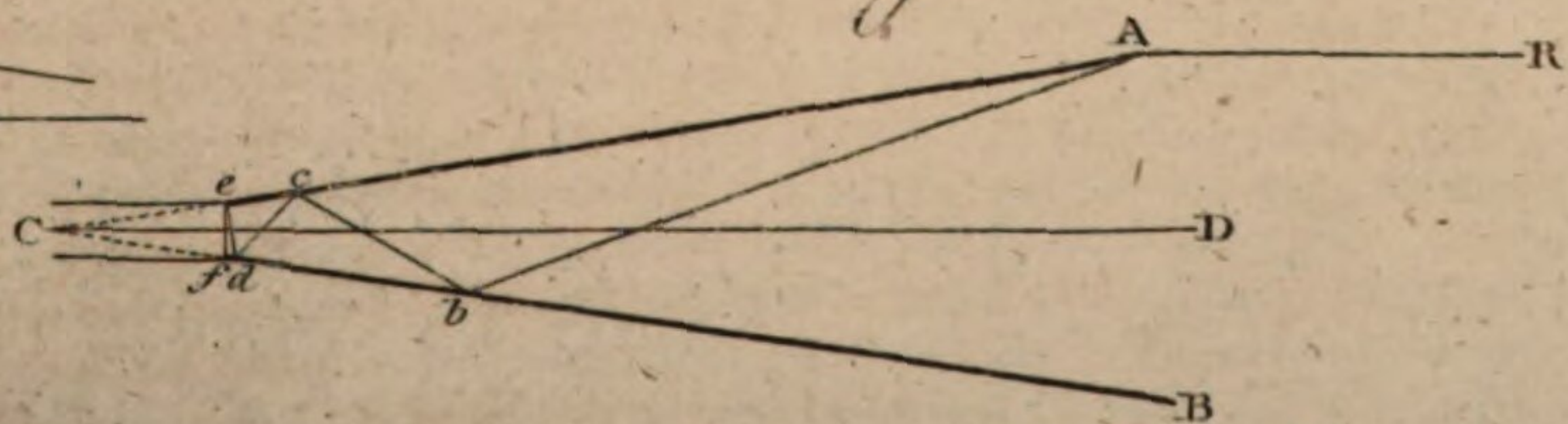


Fig. 6.



Ad Bell Prin. Nat. Sculptor fecit.

Trumpet
||
Tuam.

but founded on a principle which we do not think in the least applicable to the case of sounds.

TRUMPET, Marine, is a musical instrument consisting of three tables, which form its triangular body. It has a very long neck with one single string, very thick, mounted on a bridge, which is firm on one side, but tremulous on the other. It is struck by a bow with one hand, and with the other the string is pressed or stopped on the neck by the thumb.

It is the trembling of the bridge, when struck, that makes it imitate the sound of a trumpet, which it does to that perfection, that it is scarce possible to distinguish the one from the other. And this is what has given it the denomination of trumpet-marine, though, in propriety, it be a kind of monochord. Of the six divisions marked on the neck of the instrument, the first makes a fifth with the open chord, the second an octave, and so on for the rest, corresponding with the intervals of the military trumpet.

TRUMPET-Flower. See **BIGNONIA**.

TRUMPETER. See **PSOPHIA**.

TRUNCATED, in general, is an appellation given to such things as have, or seem to have, their points cut off: thus, we say, a truncated cone, pyramid, leaf, &c.

TRUNCHEON, a short staff or baton used by kings, generals, and great officers, as a mark of their command.

TRUNDLE, a sort of carriage with low wheels, whereon heavy and cumbersome burdens are drawn.

TRUNK, among botanists, that part of the herb which arises immediately from the root, and is terminated by fructification; the leaves, buds, and auxiliary parts of the herb not entering in its description.

TRUNNIONS, or **TRUNIONS**, of a piece of ordnance, are those knobs or bunches of metal which bear her up on the cheeks of the carriage.

TRUSS, a bundle, or certain quantity of hay, straw, &c. A truss of hay contains 56 pounds, or half an hundred weight: 36 trusses make a load.

Truss is also used for a sort of bandage or ligature made of steel, or the like matter, wherewith to keep up the parts in those who have hernias or ruptures.

Truss, in a ship, a machine employed to pull a yard home to its respective mast, and retain it firmly in that position.

TRUSTEE, one who has an estate, or money, put or trusted in his hands for the use of another.

TRUTH, a term used in opposition to falsehood, and applied to propositions which answer or accord to the nature and reality of the thing whereof something is affirmed or denied.

TRYPHIODORUS, an ancient Greek poet, who lived some time between the reigns of Severus and Anastasius. His writings were very numerous; yet none of them have come down to us, except an epic poem, on which Mr Addison has made some entertaining remarks in the Spectator, N° 63.

The first edition of this extraordinary work was published by Aldus at Venice, with Quintus Calaber's Paralipomena, and Coluthus's poem on the rape of Helen. It has been since reprinted at several places, particularly at Frankfurt in 1580 by Frischlinus; who not only corrected many corrupt passages, but added two Latin versions, one in verse and the other in prose. That in verse was reprinted in 1742, with the Greek, at Oxford, in 8vo, with an English translation in verse, and Notes, by Mr Merrick.

TUAM, a town of Ireland, in the province of Connaught, and county of Galway, with an archbishop's see. It was once a famous city, though now it is reduced to a village; yet it still retains the title of a city, as being an archiepiscopal see.

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pal see. It is seven miles from the borders of Mayo. W. Long. 8. 46. N. Lat. 53. 33.

TUB, in commerce, denotes an indetermined quantity or measure: thus, a tub of tea contains about 60 pounds; and a tub of camphor from 56 to 86 pounds.

TUBE, in general, a pipe, conduit, or canal; a cylinder, hollow within-side, either of lead, iron, glass, wood, or other matter, for the air or some other matter to have a free conveyance through it.

Auricular Tube, or instrument to facilitate hearing. See **Articulate TRUMPET**.

TUBERCLES, among physicians, denote little tumors which suppurate and discharge pus; and are often found in the lungs, especially of consumptive persons.

TUCUMAN, a province of South America, in Paraguay; bounded on the north by the provinces of Los-Chicas and Chaco; on the east by Chaco and Rio-de-la-Plata, on the south by the country of Chicuitos and Pampes, and on the west by the bishopric of St Jago. The air is hot, and the earth sandy: however, some places are fruitful enough, and the original natives have a good character. The Spaniards possess a great part of this country.

TUFA, a stone consisting of volcanic ashes concreted together with various other species of stone. It is of various colours, blackish grey, bluish grey, and yellow; every colour having a different mixture and solidity: but all of them have the bad quality of mouldering down on long exposure to the weather; notwithstanding which, they have been used in buildings both ancient and modern. The yellow kind resists the air less than any other.

TULIPA, **TULIP**, in botany: A genus of plants belonging to the class of *hexandria*, and order of *monogynia*; and in the natural system ranging under the 10th order *Coronaria*. The corolla is hexapetalous and campanulated, and there is no style. The species of this genus are four; the *sylvestris*, or Italian yellow tulip, a native of the south of Europe; the *gesneriana*, or common tulip, a native of the Levant; the *breyneana*, or cape tulip, a native of the Cape of Good Hope; and the *biflora*.

1. The *sylvestris*, or wild European tulip, hath an oblong bulbous root, sending up long narrow spear-shaped leaves; and a slender stalk, supporting at top a small yellow flower, nodding on one side, having acute petals.

2. The *gesneriana*, Gesner's Turkey tulip of Cappadocia, or common garden-tulip, hath a large, oblong, tunicated, solid, bulbous root, covered with a brown skin, sending up long oval spear-shaped leaves; an upright round stalk, from half a foot to a yard high, garnished with a few leaves, and its top crowned with a large bell-shaped erect hexapetalous flower, of almost all colours and variegations in the different varieties.

This tulip, and its vast train of varieties, is the sort so generally cultivated for the ornament of our gardens, and so much admired by all for its great variety and beautiful appearance: It grows freely in the open ground in any common soil of a garden, and proves a very great decoration to the beds and borders of the pleasure-ground for six weeks or two months in spring, by different plantings of early and late sorts; planting the principal part in autumn, and the rest towards Christmas, and in January or February. The autumn plantings will come earliest into bloom, and flower the strongest: and the others will succeed them in flowering. In summer, when the flowering is past, and the leaves and stalks assume a state of decay, the bulbs of the choicest varieties are generally taken up, the offsets separated, and the whole cleaned from filth; then put up to dry till October or November, and then planted again for the future year's bloom.

Tub
||
Tulipa.

Tulipa.

Of this species, which is the florists delight, the varieties may be divided into two principal classes, viz. 1. Early or dwarf spring-tulips (*præcocea*). 2. Late-flowering tall tulips (*serotina*). 1. *Early tulips*. The early tulips are among florists distinguished by the appellation of *præcoces* (early), because they flower early in the spring, a month or more before the others; are much shorter stalked, and the flowers smaller; but are in greater reputation for their early bloom and their gay lively colours, both of self-colours, and broken into flaked variegations; such as reds, crimson, scarlet, carnation, violets, purples, yellow, &c. with flowers of each, edged and flaked with red, yellow, and white, in many diversities. 2. *Late-flowering common tulips*.—This class is denominated *late-flowering*, and by the florists called *serotines*, because they blow later in the spring, a month or more, than the *præcoces*, i. e. not coming into flower before the end of April, May, and June. They are all of tall growth, supporting large flowers, and furnish an almost endless variety in the vast diversity of colours, after they break from whole blowers into variegations and stripes, exceeding all others of the tulip kind in beauty and elegance of flower.

Both these species of tulipa are hardy perennials, durable in root, or at least, although the old bulb decays annually, it perpetuates its species by off-sets, and is annual in leaf and stalk; which rising from the bulb early in the spring, arrives to a flowering state in April and May. All the varieties are succeeded by plenty of ripe seed in July and August, contained in an oblong capsule of three cells, having the seeds placed on each other in double rows. By the seeds many new varieties may be raised, which however will not attain a flowering state till they are seven or eight years old; and after that will require two or three years or more to break into variegations, when the approved varieties may be marked, and increased by off-sets of the root, as directed in their propagation.

The colours in greatest estimation in variegated tulips, are the blacks, golden yellows, purple-violets, rose, and vermilion, each of which being variegated various ways; and such as are striped with three different colours distinct and unmixed, with strong regular streaks, but with little or no tinge of the breeder, may be called the most perfect tulips. It is rare to meet with a tulip possessing all these properties.

As to the manner of obtaining this wonderful variety of colours in tulips, it is often accomplished by nature alone, but is sometimes assisted and forwarded by some simple operations of art; such as that, in the first place, when the seedling bulbs of the whole blower or breeder are arrived to full size, and have flowered once, to transplant them into beds of any poor dry barren soil, in order that by a defect of nutriment in the earth the natural luxuriance of the plant may be checked, and cause a weakness in their general growth, whereby they generally in this weakened or infirm state gradually change and break out into variegations, some the first year, others not till the second or third; and according as they are thus broke, they should be planted in beds of good earth.

Another method to assist nature in effecting the marvelous work of breaking the breeding tulips into diversified colours, is to make as great a change as possible in the soil; if they were this year in a light poor soil, plant them the next in a rich garden mould, and another year in a compost of different earths and dung; or transplant them from one part of the garden to another, or into different gardens, &c. or from one country to another; all of which contributes in assisting nature in producing this desirable diversity of colours and variegations.

The double tulip is also a variety of the common tulip,

and is very beautiful, though not in such estimation among the florists as the common single variegated sorts, not possessing such a profusion of variegations in the colours and regularity of stripes: they however exhibit an elegantly ornamental appearance, as they rise with an upright, tallish, firm stem, crowned with a very large double flower composed of numerous petals, multiplied in several series one within another like a double peony, but far more beautiful in their diversity of colours, variegations, and stripes of white and red, yellow and red, &c. so that they highly deserve culture, both in beds alone near the other sorts to increase their variety, also to plant in patches about the borders, in assemblage with the late variegated tulips, as they blow nearly about the same time, i. e. April and May.

Tulip-roots are sold in full collection, consisting of numerous varieties, at most of the nurseries and seeds-men, who both propagate them themselves by off-sets and seed, and import vast quantities annually from Holland; the Dutch being famous for raising the grandest collections of the finest tulips, and other bulbous flowers, in the greatest perfection, for the supply of almost all the other European gardens; distinguishing every variety in their vast collections by some pompous name or other, arranged in regular catalogues, charging prices in proportion to their estimation; which formerly was so great, among the Hollanders themselves in particular, that there are accounts of a single root being sold for from 2000 to 5500 guilders; but some time ago they were more plentiful, and were sold at from 5s. or 10s. to so many pounds per hundred, and even per root for very scarce capital sorts.

TULIP-Tree. See LIRIODENDRON.

TULL (Jethro), an Oxfordshire gentleman who farmed his own land, and introduced a new method of culture, to raise repeated crops of wheat from the same land without the necessity of manure: the principles of which he published about 30 years since, in *A Treatise on Horse-hoeing Husbandry*.

TUMBRELL, TUMBRELLUM, or *Turbichetum*, is an engine of punishment, which ought to be in every liberty that hath the view of frank-pledge, for the correction of scolds and unquiet women.

TUMEFACATION, the act of swelling or rising into a tumor.

TUMOR, in medicine and surgery, a preternatural rising or eminence in any part of the body.

TUMORS, in farriery. See there, § 26.

TUN, a large vessel or cask, of an oblong form, biggest in the middle, and diminishing towards its two ends, girt about with hoops, and used for stowing several kinds of merchandise for convenience of carriage; as brandy, oil, sugar, skins, hats, &c.

TUN is also the name of a measure. A tun of wine is four hogheads; of timber, a square of 40 solid feet; and of coals, 20 cwt.

TUN is also a certain weight whereby the burden of ships, &c. are estimated.

TUNBRIDGE, a town of Kent in England, situated on a branch of the river Medway, over which there is a bridge. It is a large well built place, noted for the mineral waters four or five miles south of the town. E. Long. 0. 20. N. Lat. 51. 14.

TUNE. See MUSIC and TONE.

TUNGSTEN, or LAPIS PONDEROSUS; a genus of calcareous earth. It contains about one half its weight of calcareous earth, and the remainder iron, and a peculiar acid of an earthy appearance, now known by the name of the *tungsten acid*. When pure, it is of a grey colour and lamellated texture; its specific gravity being from 4.99 to 5.8.

TUNICA,

Tulipa
||
Tungsten.

Tunica,
Tunis.

TUNICA, a kind of waistcoat or under garment, in use among the Romans. They wore it within doors by itself, and abroad under the gown. The common people could not afford the toga, and so went in their tunics; whence Horace calls them *populus tunicatus*.

TUNICA, in anatomy, is applied to the membranes which invest the vessels, and divers others of the less solid parts of the body; thus the intestines are formed of five tunics or coats.

TUNIS, a large and celebrated town of Africa, in Barbary, and capital of a kingdom of the same name. It is seated on the point of the Gulph of Goletta, about eight miles from the place where the city of Carthage stood. It is in the form of a long square, and is about four miles in circumference, with 10 large streets, 5 gates, and 35 mosques. The houses are all built with stone, though but one story high; but the walls are very lofty, and flanked with several strong towers. It has neither ditches nor bastions, but a good citadel, built on an eminence on the west side of the city. It is said to contain 300,000 inhabitants, of whom 30,000 are Jews. The divan, or council of state, assembles in an old palace; and the dey is the chief of the republic, who resides there. The harbour of Tunis has a very narrow entrance, through a small canal. In the city they have no water but what is kept in cisterns, except one well kept for the bashaw's use. It is a place of great trade, and is 10 miles from the sea. E. Long. 10. 16. N. Lat. 36. 42.

See Observ.
on the City
of Tunis by
Mr Stanley,
in the Edin.
Mag. vol.
iv. p. 28.

TUNIS, a country of Africa, bounded on the north and east by the Mediterranean Sea and the kingdom of Tripoli, on the south by several tribes of the Arabs, and on the west by the kingdom of Algiers and the country of Esab; being 300 miles in length from east to west, and 250 in breadth from north to south. This country was formerly a monarchy; but a difference arising between a king and his son, one of whom was for the protection of the Christians, and the other for that of the Turks, in 1574 the inhabitants shook off the yoke of both. From this time it became a republic under the protection of the Turks, and pays a certain tribute to the bashaw who resides at Tunis. The air in general is healthy; but the soil in the eastern parts is indifferent for want of water. Towards the middle the mountains and valleys abound in fruits; but the western part is the most fertile, because it is watered with rivers. The environs of Tunis are very dry, upon which account corn is generally dear. The inroads of the Arabs oblige the inhabitants to sow their barley and rye in the suburbs, and to inclose their gardens with walls. However, there are plenty of citrons, lemons, oranges, dates, grapes, and other fruits. There are also olive-trees, roses, and odoriferous plants. In the woods and mountains there are lions, wild beeves, ostriches, monkeys, cameleons, roebucks, hares, pheasants, partridges, and other sorts of birds and beasts. The most remarkable rivers are the Guadalcarbar, Magrida, Magerada, and Caps. The form of government is aristocratic; that is, by a council, whose president is the dey, not unlike the doge of Venice. The members of the divan or council are chosen by the dey, and he in his turn is elected by the divan; which is composed of soldiers, who have more than once taken off the dey's head. The bashaw is a Turk, residing at Tunis; whose business is to receive the tribute, and protect the republic: the common revenues are only 400,000 crowns a-year, because the people are very poor; nor can they send above 40,000 men into the field; nor more than 12 men of war of the line to sea, even upon the most extraordinary occasions. There are generally about 12,000 Christian slaves in this country; and the inhabitants carry on a great trade in linen and woollen

cloth. In the city of Tunis alone there are above 3000 clothiers and weavers. They also have a trade in horses, olives, oil, soap, ostriches eggs and feathers. The Mahometans of this city have nine colleges for students, and 86 petty schools. The principal religion is Mahometanism; but the inhabitants consist of Moors, Turks, Arabs, Jews, and Christian slaves. However, the Turks, though fewest in number, domineer over the Moors, and treat them little better than slaves.

TUNKERS, a religious sect of baptists in Pennsylvania, so called from the word *tunker*, to put a morsel in sauce. They are also called *tumblers*, because in performing baptism they plunge the person into the water with the head first. As the Germans found the letters *t* and *b* like *d* and *p*, the words *tunkers* and *tumblers*, have been sometimes written *dunkers* and *dumplers*. Their church-government and discipline are the same with those of the English baptists, except that every brother is allowed to speak in the congregation, and the best speaker is usually ordained to be their minister. They are a harmless, well-meaning people.

TUNNAGE. See **TONNAGE**.

TUNNY, in ichthyology. See **SCOMBER**.

TUNNY-FISHING. See **FISHERY**.

TURBAN, the head-dress of most of the eastern nations. It consists of two parts, a cap and sash of fine linen or taffety, artfully wound in divers plaits about the cap. The cap has no brim, is pretty flat, though roundish at top, and quilted with cotton; but does not cover the ears. There is a good deal of art in giving the turban a fine air; and the making of them is a particular trade. The sash of the Turks turban is white linen; that of the Persians red woollen. These are the distinguishing marks of their different religions. Sophi king of Persia, being of the sect of Ali, was the first who assumed the red colour, to distinguish himself from the Turks, who are of the sect of Omar, and whom the Persians esteem heretics.

TURBINATED, is a term applied by naturalists to shells which are spiral or wreathed conically, from a larger basis to a kind of apex.

TURBITH-MINERAL. See **CHEMISTRY**, n° 705, and **PHARMACY**, n° 303.

TURBO, the **WREATH**, in zoology, a genus of insects belonging to the order of *vermes testacea*. The animal is of the snail kind; the shell consists of one spiral solid valve, and the aperture is orbicular. There are 116 species; of which the most remarkable are, 1. The *littoreus*, or periwinkle. This is abundant on most rocks far above low-water mark. The Swedish peasants believe, that when these shells creep high up the rocks, they indicate a storm from the south. They are eaten by the poor people in most parts of this kingdom. Young lobsters are said to take up their lodging in the empty shells of these animals, which has given occasion to a notion that periwinkles are changed into lobsters. 2. The *clathrus*, or barbed wreath, has a taper shell of eight spires, distinguished by elevated divisions running from the aperture to the apex. There is a variety pellucid, with very thin edges. It is analogous to that curious and expensive shell, the *wentle-trap*.

TURBOT, in ichthyology. See **PLEURONECTES**.

TURCÆ, or **TURCI**, (Mela); supposed to be the *Tusci* of Ptolemy; whom he places between Caucasus and the Montes Ceraunii. The name is said to denote, "to desolate, or lay waste." Herodotus places them among the wild or barbarous nations of the north. There is a very rapid river called *Turk*, running into the Caspian Sea, from which some suppose the Turks to take their name. They made no figure in the world till towards the 7th century; about the beginning of which they sallied forth from the

Tunkers
||
Turcæ.

Turcoise
||
Turdus.

Portæ Caspiæ, laid waste Persia, and joined the Romans against Chosroes king of Persia. In 1042 they subdued the Persians, in whose pay they served, and from whom they derived the Mahometan religion: and afterwards pouring forth, over-ran Syria, Cappadocia, and the other countries of the Hither Asia, under distinct heads or princes, whom Ottoman subduing, united the whole power in himself, which to this day continues in his family, and who fixed his seat of empire at Prusa in Bithynia. His successors subdued all Greece, and at length took Constantinople in 1453; which put a period to the Roman empire in the East, under Constantine the last emperor. It is a standing tradition or prophecy among the Turks, that their empire will at length be overturned by the Franks or Christians; which seems now to be drawing on apace towards accomplishment.

TURCOISE. See TURQUOISE.

TURCOMANIA, a province of Asiatic Turkey, answering to the ancient kingdom of Armenia.

TURDUS, the thrush; a genus of birds belonging to the order of *passeres*. The bill is straightish, bending towards the point, and slightly notched near the end of the upper mandible. The nostrils are oval, naked or half covered with a membrane; the corners of the month are furnished with a few slender hairs, and the tongue is slightly jagged at the end. There are 136 species; of which 7 are British, the *viscivorus*, *pilaris*, *iliacus*, *musicus*, *roseus*, *merula*, and *torquatus*.

1. The *viscivorus*, or mistle, is the largest of the genus. Its length is 11 inches; its breadth $16\frac{1}{2}$. The bill is shorter and thicker than that of other thrushes; dusky, except the base of the lower mandible, which is yellow. The irides are hazel. Head, back, and lesser coverts of the wings, are of a deep olive brown. The lower part of the back is tinged with yellow. The lowest order of lesser coverts, and the great coverts, are brown; the first tipped with white, the last both tipped and edged with the same colour. The inner coverts of the wings white. The tail is brown; the three outermost feathers tipped with white. The cheeks and throat are mottled with brown and white; the breast and belly are whitish yellow, marked with large spots of black; the legs are yellow.

These birds build their nests in bushes, or on the side of some tree, generally an ash, and lay four or five eggs: their note of anger or fear is very harsh, between a chatter and shriek; from whence some of its English names. Its song, however, is very fine; which it begins sitting on the summit of a high tree, very early in the spring, often with the new-year, in blowing showery weather, which makes the inhabitants of Hampshire to call it the *storm-cock*. It feeds on insects, holly and mistletoe berries, which are the food of all the thrush kind: in severe snowy weather, when there is a failure of their usual diet, they are observed to scratch out of the banks of hedges the root of arum, or the cuckoo pint; this is remarkably warm and pungent, and a provision suitable to the season.

2. The *pilaris*, or fieldfare, is in length 10 inches, in breadth 17. The head is ash coloured inclining to olive, and spotted with black; the back and greater coverts of the wings of a fine deep chestnut; the tail is black; the lower parts of the two middlemost feathers, and the interior upper sides of the outmost feathers excepted; the first being ash coloured, the latter white. The legs are black; the talons very strong.

This bird passes the summer in the northern parts of Europe; also in Lower Austria. It breeds in the largest trees; feeds on berries of all kinds, and is very fond of those of the juniper. Fieldfares visit our islands in great flocks about Michaelmas, and leave us the latter end of February or the beginning of March.

These birds and the redwings were the *turdi* of the Romans, which they fattened with crumbs of figs and bread mixed together. Varro informs us that they were birds of passage, coming in autumn, and departing in the spring. They must have been taken in great numbers; for, according to Varro (lib. 3. c. 5.) they were kept by thousands together in their fattening aviaries. They do not arrive in France till the beginning of December.

3. The *musicus*, or throistle, is in length 9 inches, in breadth $13\frac{1}{2}$. In colour, it so nearly resembles the mistle-thrush, that no other remark need to be added, but that it is less, and that the inner coverts of the wings are yellow.

The throistle is the finest of our singing birds, not only for the sweetness and variety of its notes, but for the long continuance of its harmony; for it obliges us with its song for near three parts of the year. Like the mistle-bird, it delivers its music from the top of some high tree; but to form its nest descends to some low bush or thicket: the nest is made of earth, moss, and straw, and the inside is curiously plastered with clay. It lays five or six eggs, of a pale bluish green, marked with dusky spots.

4. The *iliacus*, or redwing, has a very near resemblance to the throistle; but is less: their colours are much the same; only the sides under the wings and the inner coverts in this are of a reddish orange, in the throistle yellow; above each eye is a line of yellowish white, beginning at the bill and passing towards the hind part of the head.

These birds appear in Great Britain a few days before the fieldfare; they come in vast flocks, and from the same countries as the latter. With us they have only a disagreeable piping note; but in Sweden, during the spring, they sing very finely, perching on the top of some tree among the forests of maples. They build their nests in hedges, and lay six bluish-green eggs spotted with black.

5. The *merula*, or black-bird, when it has attained its full age, is of a fine deep black, and the bill of a bright yellow; the edges of the eyelids yellow. When young, the bill is dusky, and the plumage of a rusty black, so that they are not to be distinguished from the females; but at the age of one year they attain their proper colour.

This bird is of a very retired and solitary nature; frequents hedges and thickets, in which it builds earlier than any other bird: the nest is formed of moss, dead grass, fibres, &c. lined and plastered with clay, and that again covered with hay or small straw. It lays four or five eggs of a bluish-green colour, marked with irregular dusky spots. The note of the male is extremely fine, but too loud for any place except the woods: it begins to sing early in the spring, continues its music part of the summer, desists in the moulting season, but resumes it for some time in September and the first winter-months.

6. The *torquatus*, or ring-ouzel, is superior in size to the black-bird; the length is 11 inches, breadth 17. The bill in some is wholly black, in others the upper half is yellow; on each side the mouth are a few bristles; the head and whole upper part of the body are dusky, edged with pale brown; the quill-feathers and the tail are black. The coverts of the wings, the upper part of the breast, and the belly, are dusky, slightly edged with ash-colour. The middle of the breast is adorned with a white crescent, the horns of which point to the hind part of the neck. In some birds this is of a pure white, in others of a dirty hue. In the females and in young birds this mark is wanting, which gave occasion to some naturalists to form two species of them.

The ring-ouzel inhabits the Highland hills, the north of England, and the mountains of Wales. They are also found to breed in Dartmoor, in Devonshire, and in banks on

Turdus.

Turenne
||
Turgot.

on the sides of streams. The places of their retreat are not known. In Scotland and Wales they breed in the hills, but descend to the lower parts to feed on the berries of the mountain-ash. They migrate in France at the latter season; and appear in small flocks about Monthard in Burgundy, in the beginning of October, but seldom stay above two or three weeks.

To these we shall add the description of the *polyglottus*, or mocking thrush, which is a native of America. It is about the size of a thrush, of a white and grey colour, and a reddish bill. It is possessed not only of its own natural notes, which are musical and solemn, but it can assume the tone of every other animal in the wood, from the wolf to the raven. It seems even to sport itself in leading them astray. It will at one time allure the lesser birds with the call of their males, and then terrify them when they have come near with the screams of the eagle. There is no bird in the forest but it can mimic; and there is none that it has not at times deceived by its call. But, unlike such as we usually see famed for mimicking with us, and who have no particular merit of their own, the mock-bird is ever surest to please when it is most itself. At those times it usually frequents the houses of the American planters; and sitting all night on the chimney-top, pours forth the sweetest and the most various notes of any bird whatever. It would seem, if accounts be true, that the deficiency of most other song-birds in that country is made up by this bird alone. They often build their nests in the fruit-trees about houses, feed upon berries and other fruits, and are easily rendered domestic.

TURENNE (Viscount). See TOUR.

TURF, *peat*, a blackish earth used in several parts of England, Holland, and Flanders, as fuel. Turf, as distinguished from peat, consists of mould interwoven with the roots of vegetables; when those roots are of the bulbous kind, or in a large proportion, they form the looser and worse kind of turf; but when mixed with a considerable proportion of peat, they form what is called *stone-turf*; it at first hardens, but at last crumbles by long exposure to the air.

TURGESCE, among physicians, denotes a swelling or growing bloated.

TURGOT (Anne Robert James), the famous financier, was born at Paris May 10. 1727, of a very ancient Norman family. His father was for a long time provost of the corporation of merchants. During this period he was the object of general admiration; and the regularity and economy of his administration procured him the particular respect of the citizens. M. Turgot was the youngest of three brothers. The eldest was intended for the rank of magistracy, which had been the station of his family for several generations; the second was destined for the army; and Robert for the church. He had scarcely attained the age at which reflection commences, when he resolved to sacrifice all temporal advantages to liberty and conscience, and to pursue his ecclesiastical studies without declaring his repugnance to their proposed object. At the age of 23 years he took his degree, and was elected prior of the Sorbonne.

The time when it was necessary for him to declare that he would not be an ecclesiastic was now arrived. He an-

nounced this resolution to his father by letter, showing the motives which induced him to decline the clerical order. His father consented, and he was appointed master of requests. M. Turgot prepared himself for this office by particular application to those parts of science which are most connected with its functions and duties, viz. the study of natural philosophy, as far as it relates to agriculture and manufactures, to the subjects of merchandise, and the execution of public works, together with such parts of mathematical knowledge as lead to a practical application of natural philosophy, and facilitate the calculations that are frequently necessary in politics, commerce, and law.

About this period he wrote some articles for the *Encyclopédie*, of which the most capital were, *Etymology*, *Existence*, *Expansibility*, *Fair*, and *Foundation*. He had prepared several others, but these five only were inserted; the persecution set on foot against the *Encyclopédie* hindered him from continuing to write in it, being unwilling that his opinions should be published in a work which was received with disapprobation by some of the most distinguished people of that time.

In 1761 M. Turgot was appointed intendant of Limoges. In this office he did much good. He gave activity to the society of agriculture established at Limoges, by directing their efforts to important objects: he opened a mode of public instruction for female professors of midwifery: he procured for the people the attendance of able physicians during the raging of epidemic diseases: he established houses of industry, supported by charity (the only species of almsgiving which does not encourage idleness): he introduced the cultivation of potatoes into his province, &c. &c. While M. Turgot proceeded with unremitting activity and zeal, in promoting the good of the people over whom he was placed, he meditated projects of a more extensive nature, such as an equal distribution of the taxes, the construction of the roads, the regulation of the militia, the prevention of a scarcity of provision, and the protection of commerce.

At the death of Louis XV. the public voice called M. Turgot to the first offices of government, as a man who united the experience resulting from habits of business to all the improvement which study can procure. After being at the head of the marine department only a short time, he was, August 24. 1774, appointed comptroller general of the finances. During his discharge of this important office, the operations he carried on are astonishing. He suppressed 23 kinds of duties on necessary occupations, useful contracts, or merited compensations. He abolished the *corvée* (A) for the highways, saving the nation thirty millions of livres annually.—He set aside another kind of *corvée*, which respected the carriage of military stores and baggage.—He abated the rigour in the administration of indirect impositions, to the great profit of the contributors, the king, and the financiers.—He softened the mode of collecting the territorial imposts.—He stopped the progress of a plague among cattle.—He suppressed a sedition conducted with art.—He provided for the equal distribution of subsistence.—He gave the utmost encouragement to the cultivation of the three chief productions of France, viz. wheat, cattle, and wine, and to the commerce thence resulting.—He reformed a number of abuses, some of which yielded a profit

(A) The word *corvée* seems to be derived from *cura via*, i. e. "the care of the roads." It signifies the call made on individuals to furnish labour and materials in kind for the construction and repair of roads. The same exists to this day in England, under the name of *statute duty*. It is indeed with us under proper restrictions; but in France, where there are no turnpikes, all the roads, which are very good, were made and repaired by the *corvée* alone; whence it became an intolerable burden to the labourers.

Turgot,
Turin.

to the place he filled.—He abolished as much as he could the sale of offices.—He formed many useful establishments.—He paid the pensions of the poorer servants of the state, who were four years in arrear.—He supplied the expences of a coronation, the marriage of a princess, and the birth of a prince.—He facilitated payments as far as India.—He settled a part of the colony debts, and put the rest in order.—He found the public borrowing at five and a half *per cent.* and reduced the rate to four.—He lessened the public engagements 84 millions.—He found the revenue 19 millions deficient, and left a surplus of three millions and a half.—All these he accomplished within the space of 20 months, during seven of which severe fits of the gout totally incapacitated him for business.

At length, however, by the artifices of the courtiers, his office was taken from him; but when removed to a private station, M. Turgot did not experience that frightful void which is the just but dreadful punishment of ambitious men when deserted by fortune. The sciences and the belles lettres, which he had cultivated in his youth, afforded him consolation, while an active sphere of life was denied him. Natural philosophy and chemistry were his favourite pursuits; yet he frequently entertained himself with poetry, especially with translating Virgil into French verse. "We know (says the Marquis de Condorcet) but of one Latin verse composed by M. Turgot, and which was intended for a picture of Dr Franklin.

Eripuit calo fulmen, mox sceptrum tyrannis."

The attacks of the gout, under which he had long laboured, becoming more frequent and excessive, forewarned him of the approaching moment, when, in conformity to the laws of nature, he was going to fill in a higher order of beings, the rank which these laws destined for him. He died March 20. 1781.

For a more ample account of this illustrious statesman, we refer the reader to the History of his Life, written by the Marquis de Condorcet.

TURIN, an ancient, populous, strong, handsome, flourishing city of Italy, and capital of Piedmont, where the sovereign resides, with an archbishop's see, a strong citadel, and an university. It is seated on a vast plain, at the confluence of the rivers Doria and Po. It is one of the handsomest places in Italy; but the air is unhealthy in the autumn and winter on account of the thick fogs. One half of this place is lately built; and the streets are straight and clean, being washed by an aqueduct. The two largest streets are the New-street and that of the Po, which are lighted in the winter-time. The houses are handsome, and all built of the same height. The ducal palace consists of two magnificent structures, joined together by a gallery, in which are several statues, all sorts of arms, the genealogy of the dukes of Savoy, a representation of the celestial signs, a royal library, and many other curiosities. Besides these two structures, there is the palace of the prince of Carignan, the hospital of St John, the seminary of the Jesuits, the royal hospital, and the metropolitan church of St John, wherein they pretend to keep the cloth in which is the print of the face of Jesus Christ. These are all superb structures. When the plague reigned at Marseilles in 1720, a great number of artificers withdrew to Turin; insomuch that there are now above 87,000 inhabitants, and 48 churches and convents. Turin is very well fortified, and extremely strong; as the French found by experience in 1706, who then besieged it a long while to no purpose. The citadel, which is flanked with five bastions, is without doubt a masterpiece of architecture. There are very fine walks on the ramparts, which require two hours to pass round them. There are also very

fine gardens on the side of the river Po; and the house commonly called *La Charité* is remarkable, as there is room for 3000 poor people. The college of the academy is very large and well built, and has a great number of ancient inscriptions. In the royal library are 19,000 manuscripts, besides 30,000 printed books. It is charmingly seated at the foot of a mountain, 62 miles north east of Genoa, 72 south-west of Milan, and 280 north-west of Rome. E. Long. 7. 45. N. Lat. 44. 50.

TURKEY, in ornithology. See MELEAGRIS.

TURKEY, a very extensive empire, comprehending some of the richest countries in Europe, Asia, and Africa. See TURCÆ.

Under the article CONSTANTINOPLE, n^o III, *et seq.*, we have given an account of the origin and progress of the Turks, as far as seemed necessary for understanding the subsequent and more important part of their history. In 1453 they made themselves masters of the city of Constantinople, which from that time became the capital of their empire. Mohammed II. at that time the sultan, after having treated the inhabitants with the greatest cruelty, began to think of adding Servia to his dominions. Accordingly, in 1454, he entered that country at the head of 20,000 men, and obliged the inhabitants to pay him an annual tribute of 40,000 ducats. On his return to Adrianople, Mohammed re-peopled the towns and villages about Constantinople with 4000 men and women who fell to his share; and going to that city, built a palace eight stadia in compass, which he lined with lead taken from the monasteries. Next year a fleet was sent against the islands of Rhodes and Chios; but the attempt on both proved unsuccessful: however, the island of Cos was reduced, and some other places; after which the sultan, turning his arms towards Hungary, laid siege to Belgrade. At first he met with success; beat down part of the wall, and stopped the navigation of the river with 60 vessels: but the celebrated John Hunniades, happening to arrive at that critical juncture, made a furious sally, entirely routed the Turkish army, wounded Mohammed himself in the thigh, and burnt all his ships. Hunniades himself did not long survive this engagement, dying soon after of a wound he had received therein according to some, or of the plague according to others.

Mohammed being thus repulsed from Belgrade, set about the entire conquest of the Morea, the ancient Peloponnesus. The Grecian princes, among whom were two of the emperor's brothers, Thomas and Demetrius, were so terrified by the taking of Constantinople, and the great progress of the Turks, that they prepared to retire into Italy; upon which the Albanians seized on the country, choosing one Manuel Cantacuzenus, a Greek, for their prince. Then falling on the Greeks who remained, they made an offer to the sultan of the cities and fortresses, provided he would allow them to keep the open country; for the Albanians were shepherds, who had no fixed habitation. At this time, however, the sultan chose rather to support the Greeks than to let the country fall into the hands of such barbarians; and having defeated the Albanians, was content to accept of a tribute from the Greeks. But the danger was no sooner over, than the Grecian princes revolted anew; upon which Mohammed entering the country with a powerful army, prince Thomas, with his family, fled to Italy; while Demetrius thought it most eligible to submit to the sultan, by whom he was carried away, with many of the most considerable persons of Lacedæmon, Achaia, &c. where Turkish governors were appointed. Two thousand families were also carried away from the Morea, in order to be settled at Constantinople, and 2000 young men to be enrolled among the sultan's troops. Many cities at this time fell into the hands

Turkey.

Constanti-
nople be-
comes the
capital of
the Turkish
dominions.Unsuccess-
ful attempt
on Rhodes
and Chios.Moham-
med repul-
sed at Bel-
grade.Expedition
against the
Morea.One of the
Greek
princes sub-
mits.

Turkey. of the Turks, among which the principal were Corinth and Athens. The Greeks, however, still made some faint struggles; but all in vain: for by the year 1459 the whole country was subdued, excepting some maritime places held by the Venetians; and prince Thomas was obliged finally to take up his abode at Rome, where he was lodged in the pope's palace, and had a pension of 3000 livres a-year allowed him for his expences.

6
The whole
country
subdued.

Mohammed now pursued his good fortune; and having made war on the emperor of Trebizond, he subdued his dominions, and put him to death. His career, however, was for some time stopped by Scanderbeg the Epirote. This prince had already defeated an army of 12,000 Turkish horse, of whom only 5000 escaped the slaughter; and dispersed another, with the loss of their general, and 4120 of his men killed on the spot. Encouraged by this success, he laid siege to Belgrade, which it seems was now in the hands of the Turks: but, through the treachery of his scouts, his army was defeated, and 5000 of his men killed; upon which, one of his generals, by name *Moses*, went over to the Turks.

7
War with
Scanderbeg

8
His success
against the
Turks.

Scanderbeg, not at all dispirited by this misfortune, prosecuted the war with the utmost vigour. His first enterprise was against his perfidious general Moses, who had been immediately put at the head of an army by the sultan. This army was by Scanderbeg totally destroyed, excepting about 4000 men; upon which Moses fell into such disgrace with the Turks, that he returned to his old master, who forgave his treachery, and restored him to all his former posts.

The bad success of Moses did not prevent Amesa, the nephew of Scanderbeg, from following his example. Mohammed received him kindly, and sent him with Ishak bashaw of Constantinople; whom he intrusted with an army of 50,000 men against his uncle. Scanderbeg, with only 6000 men, retired towards Lyssa, a maritime city of the Venetians. The Turks pursued, contrary to the advice of Amesa; and being surprised by Scanderbeg, were utterly defeated, with the loss of their camp, 20,000, or, according to others, 30,000 men killed on the spot, and the treacherous Amesa taken prisoner. With the like good fortune Scanderbeg defeated three other Turkish armies, one of 20,000, another of 30,000, and the third of 18,000 men. On this Mohammed sent against him an old experienced commander, at the head of 40,000 chosen troops; but as he likewise was able to achieve nothing, the sultan thought proper to conclude a peace with Scanderbeg in 1461.

9
Peace con-
cluded.

10
Other con-
quests of
Mohammed.

11
A formidable
combination
against the
Turkish
powers.

12
The war
carried on
with various
success.

Mohammed being thus freed from such a troublesome enemy, completed the conquest of the Greek islands; subdued Wallachia, Bosnia, and Illyria, extending his empire nearly to the confines of Italy. But as it was easy to see that no conquests would satisfy the Turkish ambition, the Venetians, who found themselves ill-treated by their warlike neighbours, entered into an alliance with the Hungarians, to repress the overgrown power of the Turks, and prevent the western parts of the world from being totally overrun by them; and into this alliance Scanderbeg was soon drawn, notwithstanding his treaty with Mohammed already mentioned. The Hungarians invaded the Turkish dominions on the west side, defeated some troops, and carried off 20,000 slaves: the Venetians invaded the Morea, where they made some conquests, but were soon obliged to abandon them: however, they recovered the island of Lemnos; but being defeated in two engagements at land, they were obliged to solicit assistance from France, Germany, and Spain. Having obtained considerable supplies from those parts, they again entered the Morea; but meeting with still worse success than before, they applied for assistance to Matthias the son of John Hunniades king of Hungary. Matthias

willingly made another incursion into the Turkish dominions, ravaged Servia, and carried off a vast number of prisoners with a great booty.

In the mean time, Mohammed, fearing lest Scanderbeg should be declared generalissimo of the Christian forces, sent to him, desiring a renewal of the league between them. But this being refused, the war was renewed with the utmost vigour. Many Turkish armies were sent against this hero; but they were utterly defeated and dispersed, till the year 1466, when by his death the sultan was freed from the most formidable enemy he had ever encountered.

The death of Scanderbeg was followed by the entire reduction of Epirus and Albania. The Venetians in 1469 defeated the Turks in a pitched battle; but were driven out of Negropont, at that time the strongest city in Europe: after which they entered into an alliance with Ferdinand king of Naples, Lewis king of Cyprus, and the grand master of Rhodes, at the same time that they sent ambassadors to Uzun Hassan king of Persia, in order to persuade him to attack the Turkish dominions on the east side. Mohammed did not lose his courage at the number of his enemies; but having defeated the Persians, reduced the Venetians to such distress, that they were obliged to conclude a treaty in 1479.

In 1481 the war was renewed, and the city of Rhodes besieged, but without success; however, the city of Cephalonia was taken from the Venetians, Italy invaded, and the city of Otranto taken. This was the last of the exploits of Mohammed II. who died this year of the gout, and was succeeded by his son Bayezid, or Bajazet II. Under this prince a war commenced with the Mamalukes of Egypt, which, under his successor Selim I. ended in the total subjection of that country. Bajazet, however, greatly facilitated Selim's conquest by the reduction of Circassia, whence the Mamalukes drew their principal resources. Carmania and Croatia were totally reduced; the cities of Lepanto, Modon, and Durazz, taken by the Turks, though the Venetians recovered Cephalonia; Syria on the east, and Moldavia on the west, were invaded and ravaged by the victorious armies of the sultan; till at last a peace was concluded with the European powers in 1503.

The year 1509 is remarkable for a dreadful earthquake at Constantinople, which overturned a great number of houses, and destroyed 13,000 people; being also followed by an epidemic distemper, which carried off great numbers. About this time also the sultan, finding the infirmities of old age drawing on, and being desirous of passing the remainder of his days in quiet, resolved to resign the throne to his eldest son Achmed. But having engaged in this affair with too great precipitation, and before he had gained over the grandees, his second son Selim, whom he had made governor of Trabezond, hastily crossing the Euxine sea, dethroned and put to death his father, in the year 1512.

The new emperor, who had not scrupled to sacrifice his father to his ambition, did not hesitate at establishing himself on the throne by the death of his brother also. Accordingly, as Achmed, knowing he could be nowhere safe, resolved to stand on his defence, Selim with a powerful army marched against him; and having defeated the few forces of his brother, took him prisoner, and put him to death. Having thus secured himself, he marched against the Persians, whom he overthrew in a great battle: after which he took the city of Taurus; made some other conquests; and having secured tranquillity on the eastern side of his dominions, turned his arms against Sultan Gauri of Egypt. Him he reduced in the manner related under the article EGYPT, n^o 101. His farther designs of conquest were frustrated by his death, which happened in the year 1519.

Selim.

Turkey.

24
Is succeeded
by Solyman
a warlike
prince.

25
The city of
Rhodes re-
duced.

26
The king
of Hungary
defeated
and killed.

27
Vienna be-
sieged with-
out success.

28
Georgia,
Bagdad,
&c. redu-
ced.

29
Tunis re-
duced by
Charles V.

30
Hungary
reduced to
a Turkish
province.

31
Malta be-
sieged un-
successfully

32
Account of
the battle of
Lepanto.

Selim was succeeded by his son Solyman I. surnamed *Kanuni*, or *The Lawgiver*, who proved no less ambitious and warlike than his father. Having defeated and killed the governor of Damascus, who had rebelled against him, he attacked the European princes with a design to extend his dominions as far to the westward as he possessed to the eastward of his capital. In 1520 he set out with a great army to conquer Hungary. The city of Belgrade was immediately invested, and in a short time taken. Rhodes also being attacked by a great force by sea and land, was obliged to submit, after a most desperate resistance, as is related under that article, n° 33. *et seq.*; and Solyman entered the city in triumph on Christmas day 1522. His conquests for some time were stopped by a rebellion in Egypt; but this being soon quashed, the war with Hungary was renewed in 1525. King Lewis having rashly engaged the Turkish army of 200,000 men with only 25,000, was utterly defeated, himself drowned in a ditch, and his whole army, excepting a few horse, cut in pieces.—

This defeat was followed by the surrender of Buda, which, however, the Hungarians retook in 1528; but next year it was again taken by the Turks, and soon after both the Moldavias submitted to their jurisdiction. The city of Vienna was then invested: but after being reduced to the greatest straits, the sultan was obliged to abandon the siege by the coming on of the autumnal rains; which, however, he did not without barbarously massacring all his prisoners.

The raising the siege of Vienna was followed by an entire repulse of the Turks from the German territories: on which Solyman, resolving to extend his dominions on the east, subdued the country of Georgia, and made himself master of the city of Bagdad; at the same time that his admiral, the celebrated Barbarossa, ravaged the coasts of Italy, and took the cities of Biserta and Tunis in Africa. But, in 1536, he was obliged to retire before Charles V. of Spain, who retook the city of Tunis. Solyman, to revenge this disgrace, suspended for a time the war in Persia, in order to turn all his forces against Italy: but while this country was in danger of being totally overwhelmed, a Venetian captain having rashly taken and sunk some Turkish vessels, Solyman changed his design of attacking Italy into that of chastising the Venetians. However, after some trifling encounters, a peace was concluded in 1540.

This year the war was renewed in Hungary: the transactions were very unfortunate for the Christians, and ended in the entire reduction of the kingdom to a Turkish province. The kingdom of France, being oppressed by its enemies, entered into an alliance with Solyman, who was now grown so powerful, that the whole European powers seemed scarce able to resist him. However, in 1565, he was baffled by the knights of MALTA, as is related under that article; and in 1566 an end was put to his ambition and his conquests by death.

Solyman was succeeded by his son Selim II. surnamed *Mess*, or "The Drunken." Under him the empire at first lost nothing of its lustre; but in 1571 the maritime power of the Turks was almost entirely destroyed at Lepanto, where one of the most remarkable sea-engagements mentioned in history took place. The Christian fleet was commanded by Doria the Venetian admiral; and consisted of 78 Spanish and 3 Maltese galleys, under Don John of Austria, natural son to the emperor Charles V. Besides these, under Venieri, a Venetian officer, were 108 galleys, 6 galleasses, 2 tall ships, and a great many small galliots. Colonna, a kinsman of the pope, had also 12 of his galleys under his command. On board this fleet were 20,000 good soldiers, many of them persons of great quality, who went volunteers

in the expedition. Though the Turkish fleet consisted of 335 sail, the most experienced officers were against fighting at that time, considering the great strength of the confederates, and that there was no necessity for an engagement. But the opinion of Ali Pasha, the chief admiral, who was for a battle, prevailing, Parteu Pasha, the next in command, took on board 12,000 janisaries and spahis, drawn out of the neighbouring garrisons; besides 4000 other soldiers. Then putting out of the gulf, the fleet steered their course for the isle of Corzulates, of old Echinates, half-way between Lepanto and Patras; and the Christians moving towards them, both fleets came in sight, October 7. afternoon. Hereupon Don John, having ordered the great ensigns of the confederates, which was the signal for engaging, to be hoisted, clad in armour, went in his long boat to encourage the several squadrons of the centre under his command; while Doria did the like in the right wing, and Barbadico, the Venetian proveditor-general, in the left.

The signal was no sooner given, than the Turks, with a hideous cry, fell on six galleasses which lay at anchor near a mile a-head of the confederate fleet; but those ships fired so briskly on them, first from their forecables and then as they passed by, so galled their galleys with whole broadsides, that several of them were sunk, which made the rest bear farther off. The wind likewise chopped about to the west, and incommoded the Turks with the smoke. However, they soon rallied their disordered squadrons, and came on with surprising resolution. The action was continued for several hours with equal bravery on both sides; but victory at last declared for the confederates.

The number of Turks slain in this famous naval fight could not with certainty be known. An author who wrote an account of this war, makes their number 32,000 besides prisoners, who were about 3500. The galleys taken from them amounted to 161. Forty more were sunk or burnt; and of galliots, with other small vessels, about 60 were taken.

Notwithstanding the prodigious loss sustained by the Turks on this occasion, the confederates reaped but little advantage from this victory; and next year Kilij Ali Pasha, who had succeeded to the post of high admiral, fitted out a fleet of 250 galleys, with which he ravaged the coasts of Christendom wherever he came, and maintained his ground so well, that the confederates could never gain the least advantage over him.

The Turkish power from this time, however, began to decline. The progress of civilization being much more quick among the western nations, and their improvements in the art of war very considerable, the Turks found it not only impossible to extend their dominion over Germany, but even a matter of some difficulty to withstand the power of the western princes. During the remainder of the reign of Selim, the war was carried on in Hungary with little advantage on either side; but under his successor, sultan Morad III. the Turks met with several severe checks from the Germans.

In 1594, Mohammed III. having succeeded his father Morad, destroyed his 19 brethren, in order to secure himself on the throne; and for the same reason caused 10 of his father's wives and concubines to be thrown into the sea, lest any of them should prove with child. The emperor Rodolph II. having entered into a confederacy against him with the princes of Transylvania, Walachia, and Moldavia, defeated the Turks and their Tartar auxiliaries in several engagements, and took many cities; while so grievous a famine and plague raged in Hungary, that of 85,000 Tartars who had entered the country the year before, scarce 8000 remained alive. This was followed by new misfortunes; so

that

Turkey.

33
The Turks
defeated
with great
laughter.

34
Little ad-
vantage
reaped by
the Chri-
stians from
the victory.

35
Decline of
the Turkish
power.

36
Confedera-
cy against
them.

37
Misfor-
tunes of the
Turks.

Turkey. that in the year following the Turks were entirely driven out of Transylvania, Moldavia, and Walachia.

38 War with Poland. In 1621, under Othman or Ozman II. we find the Turks first engaged in a war with Poland; but a peace was concluded the same year; the chief article of which was,

39 The Poles first allowed to trade to Turkey. that the Poles should have a free trade in the Turkish dominions, and that for this their merchants should pay 10,000 sequins. The Turkish affairs continued pretty much in the same way till the year 1673, when a dreadful war

40 War with Russia, Germany, and Poland. broke out with Germany, Russia, and Poland, whose army was at that time commanded by the celebrated John Sobieski. The year before, hostilities had commenced on account of the Poles having endeavoured to detach the Cossacks from their allegiance to the sultan. At this time

the Turks were successful, through the dissensions which reigned among the Poles; and the latter were obliged to pay an annual tribute of 20,000 rixdollars, and to deliver

41 The Poles defeated, and become tributary. up 48 towns and villages in the territory of Kamienieck. However, the articles of this treaty were never executed; for, in 1673, the states of Poland sent a letter to Kyoprili Ahmed Pasha, the vizir at that time, informing him that they considered as null the conditions of the treaty, being

concluded without their consent, and that they would rather suffer death than submit to the infamy of paying one

42 The state refused to ratify the treaty. single farthing by way of tribute. On this the sultan, Mohammed IV. determined to take a severe revenge on their perfidy, set out with a great army; but was entirely defeated, with the loss of 20,000 men killed on the spot, all the baggage, 25,000 waggon-loads of provision and ammunition,

43 The Turks defeated, and peace concluded. and 2000 purses of money for paying the army. Soon after this victory, John was proclaimed king of Poland: but his subjects, jealous of his glory, refused to support him properly in prosecuting his advantage; so that, four years after, a treaty was concluded, by which the Poles for ever resigned their pretensions to Kamienieck and to the dominion of the Cossacks in Podolia.

44 The Turks and Tartars defeated by the Russians. But though peace was thus made with Poland, the war was carried on very unsuccessfully with Russia. In 1678, an army of the Tartars was entirely cut in pieces or taken

near the city of Cherin; which so intimidated another army of 40,000 Turks, who had waited for the arrival of these auxiliaries, that they threw away their arms, and fled without stopping till they had crossed the river Bog. This defeat inclined the sultan to peace; but the negotiations proving ineffectual, he, in 1679, again sent a powerful army of

45 Another army defeated, and reduced to great distress. 80,000 Turks, 30,000 Tartars, and 4000 Cossacks, under the command of the vizir, to retrieve his lost honour. This army, however, succeeded little better than the former: for the vizir was defeated in several engagements; and at last, according to custom, put to death on account of the bad

46 War with the Venetians. success of the war. In 1684 the Venetians again declared war, while the Poles and Germans continued their hostilities with the utmost violence. The Turks were forced to yield to the superior fortune and valour of their adversaries; they were defeated in a great number of engagements, and lost many places of importance. In short, their affairs seemed to be totally going to wreck, when, in 1688, they were re-

47 The Turkish affairs retrieved by Kyoprili. trieved by the new vizir Ahmed Kyoprili, a man of great skill and experience in war, as well as of the most upright and blameless character. Having prevailed in the divan to have the war carried on, he applied his whole care to the raising of an army, and providing warlike stores. But find-

48 He rouses the enthusiasm of the people. the people everywhere intimidated and unwilling to oppose the enemy, the treasury exhausted, and an universal languor prevailing, he made a new kind of proclamation, in which he told the people, that "as he found it necessary to trust the command of the army against the haughty Germans to none

but himself, so he would not employ in this expedition any

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soldier forced into the service; knowing that the will was of more value with God than the deed: that he would only put the Mussulmans in mind, that, by the precepts of God and his prophet, every one is commanded neither to avoid martyrdom, nor to despair of success against infidels, &c. Having thus once roused the enthusiasm of the common people, they flocked in great numbers to his standard; after which, having reformed many abuses both in the civil and military departments, he led them against the enemy. The good effects of his reformatations were evident. Great numbers of the enemy were cut off, and almost all the important places taken which had been lost before, when, in 1691, he was

49 Is at last defeated and killed. defeated and killed by the Germans at Isankamen. After his death the Turkish affairs again fell into disorder; and, though the utmost efforts were used by succeeding vizirs, no progress could be made; and, in 169, a prodigious overthrow was given them by Prince Eugene at Zenta. At last, in 1698, all parties being weary of such an expensive and ruinous war, a pacification took place at Carlowitz, but on different terms with the different nations who had been at war with the Turks. The emperor made a truce for 25

50 Peace concluded. Terms made with the emperor. years, upon condition that all Transylvania should be resigned to him: the city of Temeswaer was to be restored to the Turks, and the navigation of the Teisse and Maros rivers be free to both nations; that the country between the Danube and the Teisse, called *Bachbak*, remain in the emperor's hands; that the boundary of the eastern part of Hungary, belonging to the emperor, should be a right line drawn from the mouth of the Maros towards the banks of the river Teisse to the mouth of the Bosut, where it falls into the Saave; that towards the south the Saave should part the Turkish from the Imperial limits, till it receives the Unna; and that no new castles besides Belgrade and Peterwaradin should be erected, or old ones fortified, anywhere within these boundaries.

The Russian ambassador made a truce only for two years, upon the foot of each party possessing what he had taken. The Poles made a truce on the like terms with the sultan; namely, that they should have Kamienieck, Podolia, and Ukraina, restored to them, in the same extent as possessed by them before sultan Mohammed's first expedition into Poland; and, on the other hand, resign Soczava, Nemoz, and Soraka, in Moldavia, to the Turks. The Venetians obtained these conditions: that all the Morea, as far as Hexamilos, should belong to them; and that the firm land, with Naupaktum (or Lepanto), Prevesa, and the castle of Romania, which had been demolished, should be restored to the Turks; that the bay of Corinth should be common to both, and the Venetians possess Lenkade with the adjacent islands. The yearly tribute paid by the islands in the Archipelago to the Venetians was to be abolished; and Zakynth to be declared free from the like burden by the Turks. In Dalmatia, Knin, Cing, Kiklut, Verlika, Duare, and Vergoraz, were to be left to the republic, and fixed as the boundaries of their dominions on that side. The Ragusians were to continue free, and the Venetians to retain the castles of Cattle-nuovo and Risano, with what they possessed in the neighbourhood. Both parties were allowed to fortify their borders with new fortresses; or to repair those which were decayed, excepting Naupaktum, Prevesa, and the castle of Romania before mentioned.

From the conclusion of the peace of Carlowitz to the year 1769, nothing very remarkable occurs in the Turkish history, excepting their recovery of the Morea from the Venetians by the treaty of Passarowitz. (See the article VENICE). Their war with the Russians under Peter the Great has been taken notice of under the article RUSSIA; those afterwards with PERSIA, under that article. None of these, indeed,

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52 With the Russians. 53 With the Venetians. 54 Turkish affairs to the year 1769.

4 G

Turkey. indeed, were of any great consequence; but, in 1769, a war commenced with Russia, which threatened the Ottoman empire with destruction, and which has given it such a severe check as it can scarcely recover. The origin of this war is given under the article POLAND, n° 101; and during the course of it, an almost uninterrupted train of success attended the Russian arms.—About the end of March 1769, a body of Russian troops made themselves masters of the important fortress of Afoph, at the mouth of the river Don. In the end of April, prince Gallitzin, commander in chief of the Russian army on the frontiers of Poland, passed the river Niester, hoping to take the fortress of Choczim by surprise; but being disappointed, he was obliged to return. Near the beginning of July, however, he again passed that river, and on the 13th attacked and defeated the van of the grand vizir's army, consisting of about 50,000 or 60,000 men. Thirteen thousand of the fugitives entered Choczim; which was next day invested by the Russians: but they were at last obliged to raise the siege and repass the Niester; which they could not effect without considerable loss.

In the mean time, both the Ottoman and Russian courts were displeased with the conduct of their generals. The Turkish grand vizir was deprived of his command, and afterwards beheaded; and was succeeded by Moldovani Aga Pacha, a man of a bold and enterprising spirit. On his first taking the command of the army, finding it impossible to subsist where he was, he attempted to force a passage over the Niester; but being three times repulsed with great loss, he made a precipitate retreat towards Bender, at the same time drawing the troops out of Choczim, which the Russians immediately took possession of.

Prince Gallitzin was now superseded by general Romanzow, who took the command of the army on the 29th of September. Soon after his arrival, he received news of the success of general Elmt, who, with a body of 10,000 men, had reduced the province of Yassy. He invested Bender; but finding the season of the year too far advanced, he soon withdrew his troops, and put them into winter quarters.

This first campaign had proved so unpropitious to the Turkish affairs, that the court would gladly have concluded a peace, if they could have obtained it upon honourable terms; but the Russians insisting upon the entire cession of Moldavia and Walachia as a preliminary article, the negotiations came to nothing. A new campaign was therefore resolved on; and this proved still more unsuccessful than before. The grand Russian army under general Romanzow passed the Niester in the month of May 1770; and, having assembled at Choczim on the 3d of June, marched towards Pruth: at the same time, their second army, commanded by general Panin, arrived before Bender. The plan of operation was, that the latter should form the siege of Bender, and Romanzow should cover it.

On the 18th of July, general Romanzow attacked an army of 80,000 Turks and Tartars, commanded by the Khan of Crimea, and strongly intrenched on an almost inaccessible mountain, forced their intrenchments, and obliged them to flee in the utmost confusion, leaving an immense quantity of ammunition and provisions, &c. in their camp; which they totally abandoned to the victors.—After this victory, the Russian general pushed on towards the Danube; and on the 2d of August attacked another Turkish army, commanded by the grand vizir in person, and totally defeated it, making himself master of their camp, ammunition, 143 pieces of cannon, and above 7000 carriages loaded with provisions. The loss of the Turks on this occasion was not reckoned less than 40,000 men, and some accounts raised it to 60,000.—During the course of this summer also, the for-

trefts of Kilia Nova, at the most northerly mouth of the Danube, surrendered by capitulation; and likewise that of Ackerman, or Bialogorod, near the mouth of the Niester. Bender was taken by storm on the 27th of November; and the Russians, enraged at the obstinate resistance they had met with, made a terrible slaughter of their enemies. It was computed that 30,000 Turks perished on this occasion. The fortress of Brailow, situated on the northern side of the Danube, was invested on the 26th of September; and the garrison were so much intimidated by the taking of Bender, that they abandoned the place, and most of them were drowned in crossing the river.—During this campaign, it was reckoned that the Russians took 1000 pieces of cannon from their enemies.

This year also a Russian fleet of 16 or 18 ships entered the Mediterranean, and landed a body of troops on the Morea. These being joined by the Greeks, committed great cruelties on the Turks, and made themselves masters of almost the whole country. At last, however, the Porte, notwithstanding their bad success in other parts, found means to send a force into the Morea sufficient to overpower the Russians. The Greeks now suffered in their turn; and the Russians, hearing that a Turkish fleet had passed the Dardanelles, abandoned the Morea, and failed to meet their antagonists. A battle ensued, in which the Turks were defeated; and having imprudently retired into a neighbouring harbour, they were next day entirely destroyed by the Russian fire-ships, except one ship of 64 guns, which was taken. This fleet consisted of 15 ships of the line, from 96 to 60 guns, three large frigates, and seven large armed vessels, besides galleys. After this victory, the Russian fleet blocked up the mouth of the Dardanelles, interrupted the Turkish trade, prevented the carrying of provisions to Constantinople by sea, and raised contributions from most of the islands in the Archipelago.

In 1771, matters did not at first go on so successfully on the part of the Russians. On the side of the Danube, they were obliged to keep on the defensive. Another army, under prince Dolgorucki, had better success; they reduced the whole peninsula of Crim Tartary in less than a month, though defended by an army of 50,000 men.—During these transactions the Turks made themselves masters of the fortress of Giurgewo; which enabled them to become so formidable on the side of Walachia, that prince Repnin durst not attack them. Upon his refusal to do so, he was deprived of his command; which was given to General Essen. On the 17th of August, he attacked the Turkish intrenchments; but, after a desperate engagement of four hours, was defeated, with the loss of upwards of 3000 men.

This was the only engagement of any consequence in which the Turks had proved victorious since the beginning of the war; and, after it, their usual bad fortune attended them. In consequence of their victory, they determined to winter on the northern side of the Danube, which would have been of the utmost service to them; and with which view they considerably reinforced their army in Walachia. But general Romanzow, by a train of masterly dispositions, not only thwarted all their schemes, but surprised them on their own side of the river. They had divided their army into two great bodies, which were stationed in the nearest and most important posts on the Turkish side of the Danube. On the 20th of October, one of these bodies was surprised at Tuliza by general Weisman, and another at Maczin by general Milarodowits. The event was the same in both places. The intrenchments were forced, the Turks totally routed, and their artillery, stores, and magazines taken, together with the two towns and their castles. Next day general Weisman attacked the grand vizir himself, with the like

Turkey. Bender taken, and the inhabitants massacred.

66 Vast number of cannon taken by the Russians.

67 A Russian fleet lands some troops on the Morea.

68 They destroy the Turkish fleet.

69 The Turks gain some advantages.

70 They take Giurgewo and defeat General Essen.

71 Are outwitted by General Romanzow.

72 Two Turkish armies totally defeated.

Turkey. like success. The intrenchments were forced, a vast quantity of artillery taken, and likewise the town and castle of Babadagh; while the vizir, with the remains of his army, fled 30 miles to seek refuge at Mount Hemus. A few days afterwards general Essen defeated another body of Turks, and retook the fortrefs of Giurgewo, driving the enemy totally out of Walachia. The Russian fleet this year spread ruin and desolation through the defenceless islands of the Archipelago and the coasts of Asia, striking terror into the city of Constantinople itself. A dreadful pestilence raged this year in the Turkish army; and in the autumn broke out at Moscow, where it destroyed vast numbers.

73
The grand vizir defeated, and driven beyond mount Hemus.

74
The Turks driven out of Walachia, &c.

75
They sue for peace.

76
Negotiations broken off.

77
Romanzow passes the Danube.

78
A Turkish army defeated by General Weifman.

79
Who is killed.

80
The Turks everywhere defeated.

The affairs of the Turks were now in such a desperate condition, that they very eagerly sued for peace. The only conditions on which this could be obtained, however, were, that the Crimea, Budziac Tartary, and all that vast tract of country on the coast of the Black Sea, as far as the north shore of the Danube, should continue for ever under the dominion of Russia; that the Russians should enjoy an unlimited freedom of navigation on the Black Sea, together with the possession of the city of Asoph, on the mouth of the Don; and that a sum of money should be paid them by way of indemnification for the expences of the war. These terms, however, were rejected; and the negotiations, which continued through the whole year 1772, at last came to nothing. The commissioners on both sides retired from Bucharest, the place where the congress was held, on the 22d of March 1773. For some time a desultory kind of war was carried on between detachments from the two armies. But as this was very prejudicial to the Russians, who could not be so easily recruited as the Turks, about the middle of June, Romanzow made preparations for passing the Danube with the grand Russian army, consisting of 87,000 men: which, however, he did not accomplish till the 24th; and then marched with his army, in large divisions, towards the city of Silistria. He was terribly harassed on his march by large bodies of the Turkish cavalry, of whom the grand vizir had detached 27,000 for this purpose. At last, however, they arrived before the city, which was strongly fortified, and defended by a body of troops consisting of about 24,000 men. On the 29th of June, this body was defeated by general Weifman, who commanded the van of the Russian army, and forced to retire into Silistria. The grand vizir then detached 50,000 men to the relief of the place: upon this the Russians found it necessary to retreat; which was not accomplished without very great difficulty and loss. In this retreat general Weifman was killed, and the army left all their magazines behind them.

Many other severe conflicts happened this campaign, which proved less glorious to the Russians than any of the former ones. In 1774, however, their arms were attended with better success. Romanzow's army was reinforced by 40,000 men; and, on the night between the 16th and 17th of June, passed the Danube in spite of all opposition. A continued series of engagements then happened between the Russian generals and different bodies of the Turks. In these the latter were always defeated; and at last became so much dispirited, that a body of 40,000, or, according to some accounts, of 70,000 Turks, fled at the first sight of a body of their enemies greatly inferior in number, leaving behind them all their tents and baggage, with a fine train of brass artillery. From this time, disorder, mutiny, and dismay, seized all the Turkish armies, and they absolutely refused to face their enemies. They plundered the baggage, robbed and murdered their officers, deserted by thousands, taking the road to Constantinople, and committing every kind of outrage by the way. The ministers of state, after having tried all methods to induce this lawless crew to return to their duty, were obliged

to furnish them with vessels for their transportation into Asia. According to some accounts, no fewer than 140,000 of the Turkish troops deserted in this manner. Even in the grand vizir's camp at Schunla, matters went on in the same manner. He was abandoned by his whole cavalry; his European and Asiatic troops quarrelled, and cut one another to pieces before his face; and, in short, the vast army he commanded was reduced almost to nothing. The Russian general did not fail to take advantage of these misfortunes. He placed the different divisions of his army in such advantageous situations, that he totally cut off all communication between the Turkish camp and every mean of subsistence. The unfortunate vizir, therefore, was obliged at last to submit to the terms which Romanzow dictated to him. The principal articles were, the independency of the Crimea; the absolute cession of Kilburn, Kerche, and Jenickala, and all the country between the Bog and the Nieper; a free navigation in all the Turkish seas, in which was included the passage through the Dardanelles, with all the privileges and immunities which were granted to the most favoured nations. Russia gave up all her conquests, except Asoph and Taganrok. There were, besides, several stipulations in favour of the inhabitants of Moldavia and Walachia, and the Greek islands which were restored by Russia.

Soon after this period an extraordinary alarm was excited at the Porte by the sudden appearance of a new prophet in Upper Asia. This man, whose name was *Sheik Mansour*, pretended that he was predestined by the eternal and immutable decrees of Heaven to fill up the measure of Divine revelation to mankind; and that as he was to be the last, so he was the greatest of the prophets. The scene of his ministry was in the wide and desolate regions on the borders of the Caspian Sea; and though the first rumour of his proceedings represented him as at the head of a multitude of armed enthusiasts ready to overturn the established government and the religion of Mahomet, it was soon discovered that all the military fury of his zeal was directed against the Christians. He had even influence enough to form a combination of all the nations of Caucasian Tartars against the Russians, which was certainly of some service to the Turks in that war, which the empress Catherine was now meditating against them.

In the mean time, while this war was impending, the most formidable rebellion broke out in Egypt, the granary of the Turkish empire (see EGYPT, n° 125); but it was, after a long, bloody, and dangerous war, almost suppressed by the wise conduct and intrepid bravery of Hassan Bey, the Captain Pacha or Grand Admiral, who, at the age of 70, fought with all the ardour of youth, and all the skill of the most consummate general. That veteran, however, was recalled before he was able to carry all his patriotic designs into execution, that he might aid the divan with his counsel, in the critical situation into which the empire was brought by the arrogant claims of the court of Russia. The result of the deliberations was a precipitate declaration of war against that court, contrary to the better judgment of the old Pacha. The war commenced in autumn 1787, and the hordes of Tartars which were first brought into the field, headed by the new prophet, were every where defeated by the superior discipline of the Russian troops commanded by prince Potemkin. Some enterprizes which were undertaken by the Turks against the island of Tamen and the Crimea were attended with as little success as the attempts of the Tartars; while the Emperor Joseph declared to the Porte that he would assist his ally the empress of Russia with an army of 80,000 men. Four Austrian armies were accordingly assembled; one at Carlstadt in Croatia, under the command of general de Vins; another at Peterwaradin in Hungary, commanded by general Langlois; a third on the borders of Lithuania,

Turkey. thuania, under general Febris; and the fourth in the Buccowine, under the orders of the prince of Saxe-Cobourg. Two other generals, ten lieutenant-generals, and thirty major-generals, were all ordered to prepare for active service in the frontier armies. If any thing had been yet wanting to show the fixed determination of the court of Vienna, the measure of sending general Alvinzi to act in and observe the conduct of the Russian armies during the war, and the receiving a Russian officer of equal rank to act the same part in the Austrian, would have been alone a sufficient explanation.

87
The Turks
at first suc-
cessful.

The war between the Turks and Austrians was carried on with various success. At first the advantage was evidently on the side of the Ottomans, and the imperial Joseph acquired no warlike renown. His declared purpose was to get possession of Belgrade; from which however his enemies repulsed him with disgrace. The prince of Saxe-Cobourg in his department of the war displayed indeed prodigies of valour; but being opposed to a superior force, he was long obliged to act only on the defensive. At length, being joined by a body of Russian forces under general Soltikow, preparations were made for commencing in form the siege of Choczim, which was surrendered to the allied armies on Michaelmas day 1788, after a defence which would have done honour to the ablest general in Europe. Still, however, success seemed to lean to the Turks. The grand vizir made a sudden incursion into the Bannat, and spread consternation and dismay to the very gates of Vienna. The Austrian affairs seemed approaching to a very alarming crisis; not only the splendid views of conquest which were beheld in the imagined partition of a tottering empire had totally disappeared, but had left in their place the sad and gloomy reverse of a discontented and impoverished people, an exhausted treasury, and an army thinned by pestilence and desertion. The first campaign of an invasive war had already produced an impression on the territory of the invader.

88
General
Laudohn
takes the
command
of the Au-
strian ar-
my.

In this situation of affairs Marshal Laudohn was with some difficulty drawn from his retirement to take the command of the army in Croatia; and under his auspices fortune began to smile on the Austrian arms. He quickly reduced Dubicza and Nevi, though they were both defended with the most obstinate bravery. He then sat down before Turkish Gradisca; but the autumnal rains coming on with such violence that the Saave overflowed its banks, he was compelled to raise the siege. During this period the war in the Bannat raged with the utmost violence; torrents of blood were shed on both sides; much desperate valour displayed on the one side, and many brave actions performed on the other; while a very great part of that fine but unfortunate country suffered all the desolation and ruin that fire and sword, under the dominion of vengeance and animosity, could inflict. The inhabitants were objects of commiseration; but the injustice with which the emperor had commenced the war made his personal losses be considered as nothing more than the due reward of his conduct.

Hitherto the Russians had hardly entered into the war; but at last they began to act with vigour both by sea and land. They experienced however a very general coldness with respect to their claims, pretensions, and designs, in almost all the courts of Europe. The court of London prohibited British seamen from entering into foreign service, and declared its resolution to observe the strictest neutrality. The united provinces of Holland pursued the same line of conduct; and some of the ambitious views of Russia were thus blasted. In the mean time a vast Russian army, estimated at 150,000 men, appeared on the banks of the river Bog, adjoining to the confines of Poland, Turkey, and Tartary, and on the way to the Black Sea, under the orders of prince Potemkin and general Romanzow; these being assisted by

prince Repnin, general Soltikow, and other commanders of note. This great force was supported by a field train of 137 pieces of artillery, besides a vast park of heavy battering cannon and mortars, destined for the siege of Oczakow; and furnished with that exuberance of powder, ball, shells, and all manner of military machines, which are the usual concomitants of a Russian army. After the most obstinate defence, Oczakow was taken on the 17th of December 1788, and the governor basha graced the triumphant return of prince Potemkin to Peterburgh. In the mean time Russia found herself attacked by a new and formidable enemy in the Swedish monarch, of whose exploits we have given an account elsewhere (see SWEDEN, n^o 246.); and by his interference her conquests were certainly retarded.

89
Russians
take Oczakow.

90
Gradisca and Belgrade taken by Laudohn.

91
The emperor dies, and his successor concludes a peace.

92
Success of the Russians.

93
The emperor dies, and his successor concludes a peace.

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Success of the Russians.

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The emperor dies, and his successor concludes a peace.

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Success of the Russians.

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The emperor dies, and his successor concludes a peace.

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The emperor dies, and his successor concludes a peace.

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Success of the Russians.

199
The emperor dies, and his successor concludes a peace.

200
Success of the Russians.

Soon after this, the emperor Joseph died, and his successor Leopold showed a desire for peace. After the reduction of Orsova, therefore, which happened on the 16th of April 1790, the war was carried on with languor on the part of Austria; and in the month of June a conference was agreed upon at Reichenbach, at which the ministers of Prussia, Austria, England, and the United Provinces, assisted, and at which also an envoy from Poland was occasionally present. After a negotiation, which continued till the 17th of August, it was agreed that a peace should be concluded between the king of Hungary and the Ottoman Porte; that the basis of this treaty should be a general surrender of all the conquests made by the former, retaining only Choczim as a security till the Porte should accede to the terms of the agreement, when it was also to be restored. Catherine was thus deprived of an ally, but still she continued the war. On the 22d of December 1790, the fortress of Ismail was taken by storm by general Suwarrow; and it is said that the siege and the capture did not cost the Russians less than 10,000 men. The most shocking part of the transaction is, that the garrison (whose bravery merited, and would have received from a generous foe, the highest honours) were massacred in cold blood by the merciless Russians, to the amount of, by their own account, upwards of 30,000 men; and the place was given up to the unrestrained fury of the brutal soldiery. After this bloody scene, the Russians went into winter quarters; the vizir retired towards Constantinople, and on his return fell a sacrifice to the sanguinary policy which has long disgraced the Ottoman councils.

The campaign of 1791 opened on the part of Russia with the taking of Maczin, on the 4th of April, by prince Galitzin; and in a subsequent victory on the 12th by the same general, in the neighbourhood of Brailow, the Turks lost not less

Turkey. less than 4000 men and upwards of 100 officers, besides many pieces of cannon. On the 14th the Russian arms experienced a check, by which they lost about 700 men, and were obliged to relinquish the intention of besieging Brailow. After reinforcing this place, the vizir proceeded to the banks of the Danube near Silistria; and, by means of a bridge which he threw across the river, his advanced posts were enabled to make incursions on the opposite side. The ability of the vizir and the valour of the Turks were however exerted in vain against the discipline and experience of European armies. In the month of June, 15,000 Turks were defeated by a party of cavalry under general Kutusow. On the 3d of July the fortress of Anape was taken by general Gudowitsch, and the garrison, to the amount of 6000 men, made prisoners. This event was followed, on the 9th of the same month, by a signal victory which prince Repnin obtained near Maczin over a body of 70,000, the flower of the Turkish army. The Ottomans left upwards of 4000 dead upon the field of battle, and lost their entire camp equipage, colours, and 30 pieces of cannon. The Russians are said to have lost only 150 men killed, and between 200 and 300 wounded. At last peace was restored between the Porte and Russia, principally through the mediation of Great Britain and the northern powers. Catherine, who talked high at first, confined her views at length to the possession of Ocza-kow, with the district extending from the Bog to the Nies-ter, and even then providing for the free navigation of the latter river. These terms, considering the ill success of the war, cannot be accounted very disadvantageous to the Porte, who has lost a fortress more useful for the purpose of annoying Russia than for defending their own territories; but certainly of considerable importance to Russia, which, by this cession, has secured the peaceable enjoyment of the Crimea.

93
Peace is at
last conclu-
ded.

94
Account of
the Turk-
ish domi-
nions.

The Turkish empire comprehends several countries in Europe, Asia, and Africa. In Europe it is bounded on the south by the Mediterranean; on the north by Croatia, Sclavonia, and Transylvania; on the east by Poland, Russia, and Asia; and on the west by the Adriatic and Dalmatia. The principal countries of Turkey in Europe are Romania, Bulgaria, Servia, Walachia, Moldavia, Bessarabia, Greece, Macedonia, Albania, Thessaly, Levadia, Morea, and the Archipelago islands. Turkey in Asia is divided into Eastern and Western. The Eastern comprehends Georgia, Turcomania, and Dearbekr; and the Western, Anatolia, or Asia Minor, Syria, and Palestine.—In Africa the Turkish dominions are Egypt, and some districts of Barbary. But for an account of these different countries, see the articles as they occur in the order of the alphabet.

95
Of the go-
vernment,
&c. in Tur-
key.

The grand signior, or emperor of the Turks, is restrained by no laws or compacts, the government being purely monarchical: but if he indulges not the humours of the people, and especially of the mutinous janisaries, he is in danger not only of being deposed, but also of being put to death. Those who have offices under the government he squeezes, disgraces, and puts to death, upon the least suggestion of their disaffection or misconduct, without giving them an opportunity of answering for themselves, they being looked upon as more immediately his slaves: but others seem to enjoy almost as great a degree of security, both in their persons and properties, as the subjects of other absolute monarchies. Indeed, in all such there is a gradation of governors and officers, of which the higher fleece and oppress those below them, and the lowest make reprisals upon the common people. In the succession to the empire, no regard is paid to age or birth-right, the Turks thinking it sufficient if, in their elections, they keep to the family. Women are excluded from the throne. The emperor's council is either ordinary or extraordinary. The first, meeting every Sunday and Thursday,

consists of the great officers of state, and is called the *galibe divani*. To the other, which is called *ajack divani*, are summoned all the great persons and officers of the empire, and even the oldest and most experienced soldiers. The sultan hears what passes from an adjoining chamber. At the head of the ministry is the grand vizir, who is as it were his lieutenant-general, with whom he divides, or rather to whom he leaves, the care of the whole empire; he being entrusted not only with the finances, with foreign affairs, and the administration of justice in civil and criminal matters, but also with the conduct of the war, and the command of the army. Great and dangerous as this charge is, there have been men who have executed it with safety and success both in peace and war, and have died quietly in their beds; but that is not the case with the most of them, it being the usual policy of the emperors to shelter themselves from the clamours of the people by throwing the whole blame of any mal-administration upon him, and giving him up to the public resentment. His income, without any breach of probity, may amount to 600,000 dollars, exclusive of presents and other perquisites. Notwithstanding his high dignity, his palace is open to every one, and he gives audience to the meanest of the poor. When the sultan names a grand vizir, he puts into his hand the seal of the empire; and when he honours him with the command of an army, he takes out one of the plumes of his own turban at the head of the troops, and delivers it to him to place it in his own. The other great officers of state are the *kaimakan*, or vizir's deputy, not to be confounded with the governor of Constantinople, who is also called *kaimakan*; the vizirs of the bench, or bashas of three horse-tails, because three horse-tails are carried before them when they march, and who sit in the divan or courts of justice with him; the *kadinlaskiers*, or chief justices of provinces; the *beiglerbegs* or viceroys, of which the chief are those of Romelia, Natio-lia, and Damascus; the ordinary bashas or governors of towns and districts under the *beiglerbegs*; the *reis effendi*, or lord chancellor and secretary of state; the *tefterder* or high treasurer; the *aga* of the janisaries; the *aga* of the *spahis*; the *aga* of the *filuds*, &c. The chief officers of the *seraglio* are the *kissaragasi*, who is superintendant of the women, and has the command of all the black eunuchs; the *capi aga*, who has the command of all the white eunuchs, and to whom all petitions to be presented to the prince are delivered. Both these are also eunuchs, and of the same complexion as those of whom they have the command. Besides the women and eunuchs, there are in the *seraglio* the *ichoglans* and *azamoglans*, mutes, dwarfs, and buffoons. The *ichoglans* are young men bred up in the *seraglio*, not only to serve about the prince, but to fill in time the first posts of the empire. The *azamoglans* are trained up there for inferior employments.

No children are admitted into the *seraglios* of Constantinople, Pera, or Adrianople, till they are first reviewed and approved of by the grand signior. They are generally the most beautiful, well-made, and sprightly, that can be met with. They are first taught, after being circumcised, silence and a modest humble behaviour. Then they are instructed in the Mohammedan religion, to speak and write the Turkish language, and afterwards the Persian and Arabic. As they grow up, they are taught manly exercises; and whatever is thought requisite to qualify them for state employments: but they are seldom preferred out of the *seraglio* until the age of 40.

The ladies of the harem are a collection of young beautiful virgins, either the presents of governors, purchased, or captives taken in war; most of them being the children of Christian parents. They are taught music, dancing, and other accomplishments, and furnished with the richest clothes

and

Turkey. and ornaments Some of them frequently play and dance before the grand signior, while others divert him with their conversation. They have a great many female slaves to wait on them; but are scarce ever suffered to go abroad, except when the grand signior changes his place of residence; when a troop of black eunuchs convey them to the boats, which are enclosed with lattices: and when they go by land, they are put into close chariots, and signals made at certain distances, to give notice that none may approach the road through which they are to pass.

96
Dress,
manners,
&c. of the
Turks.

The Turks are generally robust and well-shaped, of a good mien, and patient of hardships, which render them fit for war. They shave their heads; but wear their beards long, except the military and those in the seraglio, who wear only whiskers. They cover their heads with a white linen turban of an enormous size, and never pull it off but when they sleep. None but Turks must presume to wear a white turban. Their breeches or drawers are of a piece with their stockings; and they have slippers instead of shoes, which they pull off when they enter a temple or house. They wear shirts, with wide sleeves, not gathered at the wrists, and over them a vest tied with a sash; their upper garment being a loose gown, something shorter than the vest.

The women's dress pretty much resembles that of the men; only they have a stiffened cap with horns, something like a mitre, on their heads instead of a turban, and wear their hair flowing down. When they go abroad, they are so wrapped up, that their faces cannot be seen.

The Turks sit, eat, and sleep, according to the custom of the east, on sofas or cushions, mattresses, and carpets. Rice is their most general food, and coffee their common drink. Their most usual salutation is to bow the head a little, laying the right-hand on their breasts; but to persons of rank they stoop so low as to touch the border of their vest. The women are kept under a rigorous confinement. They have generally delicate skins, regular features, black hair and eyes, with an admirable chest. Many of them are complete beauties. Their cleanliness is extraordinary; for they bathe twice a-week, and suffer not the smallest hair or the least soil to be upon their bodies. As to the qualities of their minds, they are said to want neither wit, vivacity, nor tenderness; and to be exceedingly amorous. It is no doubt for this reason that the men never suffer their wives faces to be seen, not even by the dearest friend they have in the world.

There is no need of much wit to behave one's self well here; for a good mien and gravity supply the place of merit in the east, and much gaiety would spoil all. Not that the Turks want wit; but they speak little, and pride themselves in sincerity and modesty more than eloquence. The Turks use no unnecessary words, whereas the Greeks talk incessantly. Though these two nations are born under one climate, their tempers are more different than if they lived in the most distant countries. The Turks make profession of candour and faithfulness, and are a charitable good-natured people, jealousy excepted, and very sober. On the other hand, they are extremely proud, insolent, indolent, superstitious, and covetous. They are also much addicted to unnatural lusts; and despise all other nations in general, especially those which are not of their religion. The common appellation that they give the Christians is that of dogs. An uniformity runs through all the actions of the Turks, and they never change their manner of living. They seem to have no kind of genius for the improvement of the arts and sciences, though they live under the influence of the same heaven, and possess the same countries, as the ancient Grecians did. They generally loiter away their time, either among the women in the haram, or in smoking or taking opium; and

though they herd together, you will observe as little conversation among them as amongst so many horses in a stable. They seldom travel, or use any exercise or rural sports; and discover little or no curiosity to be informed of the state of their own or any other country: but Turkey, after all, is not without men of parts, probity, and honour; nor without benevolent, liberal, conversible, and ingenious people. They behave very commendably to their slaves and servants, and frequently better than the Christians do to theirs. There are no hereditary governments or titles of nobility in Turkey; and indeed the commonalty there enjoys the greatest liberty.

The languages spoken in Turkey in Europe are the Turkish and Tartarian, which have a great affinity to one another; the modern Greek, which differs widely from the ancient; the Sclavonian, and Walachian. The Arabic is the language of the learned. Learning is at a very low ebb among the Turks: however, they have some schools, colleges, and academies; but they are on a very different footing from those among us. Not many years since a printing-house was set up at Constantinople, where books of all kinds were allowed to be printed, except on matters of religion. The most ingenious Musselmens employ themselves in reading the Alcoran and the commentators upon it, to which almost all their learning is confined. Some of them amuse themselves with poetry, in which they are said to succeed very well. Other Turks delight in music, and spend the whole day in playing upon an instrument, without being tired, though they only repeat the same tune. It is said there are a great many manuscripts in the Turkish, Arabian, and Persian languages, among the Turks; but it is not to be supposed that they contain any very deep, solid, ingenious, or useful learning.

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The Turkish regular troops are the spahis and timar-spahis, who are light-horse. The latter, who have estates in land assigned them instead of pay, are obliged to bring a certain number of slaves into the field with them. The tributary princes of Moldavia and Walachia, and the Crimean Tartars, are also obliged to send auxiliaries. But the flower of the Turkish army consists of the janisaries, who amount to about 40,000, and are all infantry. They have particular privileges, being subject to no jurisdiction but that of their aga or commander. Their pay is three aspers a-day, besides victuals, and a suit of clothes every year. They are all lodged at Constantinople together in a sort of barracks, having been educated in the seraglio, and trained up to the exercise of arms from their infancy. Besides the janisaries, there is another body of foot called *capis*. The whole Turkish army, regulars and irregulars, amounts to above 300,000 men. Besides the true janisaries, or janisaries of the porte, and in actual pay, there are great numbers all over the empire, who procure themselves to be registered in this body, in order to be entitled to their privileges. The bachelors only are capable of bearing offices in the barracks or chambers at Constantinople. When any of the janisaries are disabled in the service, they have an allowance for life. To distinguish them, they wear a cap of a particular make. The emperor's guards are composed of them, and they are feared and respected everywhere, though they carry only a cane in their hand; for arms are not delivered to them but when they take the field. The chief commanders of the army are distinguished by two or three horse-tails carried before them. The Turkish navy is not so considerable as might be expected in such extensive dominions, situated on several seas, and abounding in commodious harbours. By their neglecting navigation and foreign commerce, they can never find sailors to man a great fleet; and those they have are unskilful, as well as their pilots and officers. If they would

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Turkey. would apply themselves to navigation, and make the most of their situation and advantages, they could not fail to become a very formidable maritime power. Their navy generally consists of about 40 large ships, exclusive of galleys. In time of war they hire or buy merchant-ships, and others are sent them from Algiers, Tunis, and Tripoli. The captain-basha, or admiral, is the second officer in the empire, the grand vizir being the only officer above him. His power is absolute when he is out of the Dardanelles; and not only the sea-officers, but all the governors of the maritime provinces, receive orders from him. The pilots are mostly Greeks, and the captains renegadoes. The captain-basha sails round the Archipelago, in summer, to collect the capitation-tax, and learn the state of affairs in those parts.

The revenues of the empire are paid either into the public treasury, or into the sultan's private treasury. The former, called by the Turks *deitalmali musulim*, i. e. *the public money of the Mussulmen*, is not to be touched but on the most pressing exigency of the state. The other the sultan may dispose of at pleasure. Prince Cantimir says, in his time, 27,000 purses, amounting to 13,000,000 and a half of crowns, were annually returned to both treasuries; arising from the produce of the customs, demesne lands, the capitation or tax paid by every subject of the empire who is not of the Mahometan religion; the annual tributes paid by the cham of the Crim Tartars, the princes of Moldavia, Walachia, the little republic of Ragusa, and part of Mingrelia; together with half a million of money out of a million and a half levied annually in Egypt. These are the fixed revenues: but vast sums are also raised by the confiscations of the estates and effects of the bashas and other officers, and from the estates of Turks dying without male issue.

The manufactures and commodities of Turkey are, silks, carpets, goat's hair, wool, camel's hair, cotton-yarn, dimity, burdets, waxed linen, shagreen-skins, blue, red, and yellow Morocco leather; coffee, rhubarb, turpentine, storax, gums, opium, galls, mastic, emery, lemnian bole, pomegranate-shells, sponges, dates, almonds, wine, oil, figs, raisins, mother-of-pearl, boxwood, saffron, &c. These are exported in large quantities by the several European trading nations, who import their own goods and purchase those of the country. The inland trade is carried on chiefly by the Jews and Armenians; and even the Turks send merchandise, both by land and water, from one part of the empire to another, but not to foreign Christian countries. No nation is more advantageously situated for traffic than the Turkish; having the navigation of the Black Sea, the Levant, and the Red Sea; and consequently greater opportunities of importing the rich merchandises of the East, and distributing them all over Europe, than any maritime power: but they never attempt distant voyages, and have but few merchant-ships, both their imports and exports being chiefly made in foreign bottoms. Tyre, Sidon, and Alexandria, which once commanded the navigation and trade of the world, are in their possession, but make no figure in commerce at this day: and well it is for the Christians that the Turks are such an indolent generation; for their situation and vast extent of empire would enable them to monopolize the trade of the world, if they attended to it. Several European Christian nations have envoys and residents at Constantinople, and consuls in other ports. In this empire there is a great traffic in the human species: not only male slaves, but beautiful young girls, being publicly bought and sold.

The empire is styled the Ottoman kingdom or empire, the Ottoman Porte, the Sublime Porte, the Sublime Sultanian Porte, &c. The appellation of *Porte* is said to be

derived from the large gate built by Mohammed II. at the entrance of the seraglio at Constantinople; though the Orientals in general call a royal palace the *king's porte* or *gate*. Turmeric
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TURMERIC, in botany. See **CURCUMA**.

TURNEBUS (Adrian), an eminent French critic, was born in 1512. His true name was Turnbull. He was the son of a Scotchman, an officer in the Scotch troop of guards, who married a Norman lady. The son, who is the subject of this article, changed his name into Tourneboeuf; but this name giving occasion for puns, he varied it to Turnebe, in Latin Turnebus. He acquired so extensive a reputation by his learning, that he had great offers made him from Italy, Germany, and England; but we are told he preferred poverty in his own country to riches in any other. He taught polite literature first at Toulouse; but in 1547 went to be Greek professor at Paris, whither his name drew scholars to him from all parts of Europe: in 1552, he took upon him the care of the royal Greek press for three years, when he quitted it on being admitted into the number of royal professors. He died in 1565; and his works, which are all in Latin, were printed at Strasburg, in one vol. folio, 1600. His *Adversaria*, 3 vols folio, had been printed at Paris before.

TURNER, in botany, a species of **BRASSICA**. For the culture of them, see **AGRICULTURE**, n° 151.

TURNER-Bread. See **BREAD**.

TURNER-Fly. See **CHRYSOMALA**.

TURNING, the art of forming hard bodies, as wood, ivory, iron, into a round or oval shape by means of a machine called a *lathe*.

This art was well known to the ancients, and seems to have been carried by them to a very great degree of perfection; at least, if we believe the testimony of Pliny and several other authors, who tell us, that those precious vases enriched with figures in *half-relief*, which still adorn our cabinets, were turned on the lathe.

The art of turning is of considerable importance, as it contributes essentially to the perfection of many other arts. The architect uses it for many ornaments, both within and without highly finished houses. The mathematician, the astronomer, and the natural philosopher, have recourse to it, not only to embellish their instruments, but also to give them the necessary dimension and precision. In short, it is an art absolutely necessary to the goldsmith, the watchmaker, the joiner, the smith.

Turning is performed by the lathe, of which there are various kinds, and several instruments, as gouges, chisels, drills, formers, screw tales, used for cutting what is to be turned into its proper form as the lathe turns round. One of the most simple kinds of lathe is represented in Plate DXI. fig. 1. in which *a* is the footstool, *b* the cord, *c* the frame of the lathe, *dd* the puppets, *ee* the points, *f* the spanging-tree.

The lathe should be fixed in a place very well lighted; it should be immovable, and neither too high nor too low. The puppets should neither be so low as to oblige the workman to stoop in order to see his work properly, nor so high that the little chips, which he is continually driving off, should come into his eyes.

The piece to be turned should be rounded (if it be wood) before it be put on the lathe, either with a small hatchet made for the purpose, or with a plane, or with a file, fixing it in a vice, and shaving it down till it is everywhere almost of an equal thickness, and leaving it a little bigger than it is intended to be when finished off. Before putting it on the lathe, it is also necessary to find the centres of its two end surfaces, and that they should be exactly opposite to each other, that when the points of the puppets are applied

Turning. to them, and the piece is turned round, no side may belly out more than another. To find these two centres, lay the piece of wood to be turned upon a plank; open a pair of compasses to almost half the thickness of the piece; fix one of the legs in the plank, and let the point of the other touch one of the ends of the piece, brought into the same plane with the plank on which the compasses is fixed and very near the fixed leg. Describe four arches on that end at equal distances from each other at the circumference of the end, but intersecting one another within; the point of intersection is the centre of the end. In the same manner must the centre of the other end be found. After finding the two centres, make a small hole at each of them, into which insert the points of the puppets, and fix the piece so firmly as not to be shaken out, and yet loose enough to turn round without difficulty.

The piece being thus fixed, it is necessary in the next place to adjust the cord, by making it pass twice round the piece, and in such a manner that the two ends of the cord, both that which is fixed to the *spang* and to the *foot-board*, come off on the side on which the turner stands, that the piece may move against the edge of the cutting-tool and be turned. If the lathe be moved by a wheel, the manner of adjusting the cord needs no directions.

If the workman does not choose to be at the trouble to find the two centres of the piece in the manner described above, let him lay, as nearly as he can, the centre of one end upon the point of the left hand puppet, and then let him push forward the right hand puppet, striking it with a mallet till its point is as near as he can in the centre of the other end of the piece; and then fixing the right hand puppet by a gentle blow of the mallet on the key, let him turn round the piece to see by the eye if the centres have been properly found. If any part of it bellies out, let him strike that part gently with the mallet till it goes properly; then let him strike one of the puppets pretty smartly to drive the points into the piece, and afterwards fix the puppet by striking the key. If the workman cannot judge by the eye whether the piece be turning properly round its centres or not, he should apply gently the point of an instrument called a *triangular graver*, leaning it on the *rest*, and it will mark by a line the place where the piece is out of its centre; and by striking upon this line with a mallet, the piece can easily be placed properly. The *rest*, of which we have just spoken, ought to be placed upon the two arms of the lathe, and fixed with screws as near the piece as the workman pleases.

The piece being fixed between the two points of the puppets (or, as we call them in Scotland, the *beads*), the cord adjusted, and the *rest* fixed as near the work as possible without touching it; the workman is now to take a *gouge* (fig. 2. in which *a* is the mouth and *b* the handle) of a proper size in his left hand, and hold it by the handle a little inclined, keeping the back of the hand lowermost. With his right hand, the back of which is to be turned upwards, he is to grasp it as near the end as possible on this side of the *rest*; then leaning the *gouge* on the *rest*, he is to present the edge of it a little higher than the horizontal diameter of the piece, so as to form a kind of tangent to its circumference; then putting the right foot on the foot-board, and turning round the wheel, and holding the *gouge* firmly on the *rest*, the piece will be cut neatly. In the same manner are the chisels, formers, and other instruments to be used, taking care that the wood be cut equally, and that the instrument be not pushed improperly, sometimes stronger than at others; and taking care also that the instrument used do not follow the work, but that it be kept firmly in the hand without yielding.

The young turner ought to endeavour to acquire the

Turning. management of the *gouge* and the *chisel*, which are the instruments by far the most frequently used, and the most necessary in this art: by them, almost entirely, are the soft woods turned; for as for hard woods and other things, as box, ebony, horn, ivory, and the metals, they are hardly ever turned except by *shaving off*. In that case gravers are to be used with square, round, or triangular mouths (fig. 3, 4, 5.). They should be held horizontally while applied to the wood, and not obliquely as directed for the *gouge* and the *chisel*.

After the work is completely turned, it is next to be polished; and this cannot be done with the instruments hitherto mentioned. Soft woods, as pear-tree, hazle, maple, ought to be polished with shark-skin or Dutch rushes. There are different species of sharks; some of which have a greyish, others a reddish skin. Shark-skin is always the better to be a good deal used; at first it is too rough for polishing. The *Dutch-rush* is the *equisetum hyemale* of Linnæus, which grows in moist places among mountains, and is a native of Scotland; it has a naked, simple, round stem, about the thickness of a writing pen. The oldest plants are the best. Before using them they should be moistened a little, otherwise they break in pieces almost immediately, and render it exceedingly difficult to polish with them. They are particularly proper for smoothing the hard woods, as box, lignum vitæ, ebony, &c. After having cleaned up the piece well, it should be rubbed gently either with wax or olive-oil, then wiped clean and rubbed with its own raspings or with a cloth a little worn. Ivory, horn, silver, and brass, are polished with pumice-stone finely pounded and put upon leather or a linen cloth a little moistened: with this the piece is rubbed as it turns round in the lathe; and to prevent any dirt from adhering to any part of it, every now and then it is rubbed gently with a small brush dipt in water. To polish very finely, the workmen make use of tripoli, a particular kind of earth, and afterwards of putty or calx of tin. Iron and steel are polished with very fine powder of emery; this is mixed with oil, and put between two pieces of very tender wood, and then the iron is rubbed with it. Tin and silver are polished with a burnisher and that kind of red stone called in France *sanguine dune*. They may be polished also with putty, putting it dry into shammy-skin, or with the palm of the hand.

To succeed in turning iron, it is necessary to have a *lathe* exceedingly strong in all its parts, and exceedingly well fixed. The puppets should be short, and the *rest* well fixed very near the work: the back of the *rest* should be two or three lines lower than the iron to be turned.

The lathe and other instruments being prepared, it is necessary to determine the length and thickness of the iron to be turned according to the design which is to be executed, and to make a model of it in wood a little thicker than it ought to be: Then one exactly like this is to be forged of the best iron that can be procured; that is to say, it must not be new, but well prepared and well beaten with hammers; it must have no flaws, nor cracks, nor pimples. New iron, which has not been well beaten, often contains round drops of cast iron, called by the workmen *grains*, which blunt the edges of the *gouges*, *chisels*, and other instruments used for cutting; break them, or make them slide. The iron being forged according to the model, it should be annealed, that is, heated red hot and allowed to cool slowly on the coals till the fire go out of itself. Some people, to soften the iron, cover it over with clay and allow it to cool. The iron cylinder being thus made, it is next to be put upon the lathe, finding the centres as formerly directed, and boring a small hole in them that the iron may not escape from the points.

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The points should be oiled from time to time to prevent their being excessively heated and spoiled while the iron is turning. A *crotchet* is then to be applied to the iron to be turned, a little above its centre pretty gently, and by this means the inequalities of the cylinder will be taken off. Other instruments are then to be applied to mold the iron according to the model; and whenever any of them grow hot, they are to be plunged into a basin of water lying beside the workman. If the iron, after being properly turned, is to be bored like a gun-barrel, one of the puppets is to be removed and another substituted in its place, having a square hole through it, into which the collar of the iron is to be fixed firmly, so as not to shake; then borers are to be applied, like those which locksmiths use to bore keys; and beginning with a small one, and afterwards taking larger ones, the hole is to be made as wide and deep as necessary; great care must be taken to hold the borers firm on the *rest*, otherwise there is danger of not boring the hole straight. The borer must be withdrawn from time to time to oil it and to clean the hole. Since it is difficult to make a hole quite round with borers alone, it is necessary to have also an instrument a good deal smaller than the hole, one of the sides of which is sharp, very well tempered, and a little hollow in the middle. This instrument being fixed in a pretty long handle, is to be applied with steadiness to the inner surface of the hole, and it will entirely remove every inequality that may have been there before its application.

We shall now describe the manner of cutting a screw upon our cylinder. Some persons make use of an instrument, consisting principally of a female screw, for this purpose: but this is rather an improper instrument; for if one presses too violently, or inclines it ever so little to the right or left, he runs the greatest risk of spoiling the screw. To avoid this danger, some persons use it only to trace out the lines of the screw, and afterwards finish it with a file. But there is a much better way of cutting a screw; and it is this. Take a tap for making a female screw, the threads of which have been cut very accurately, and exactly of the size of the screw which you want; and having put it in the opening which you have traced in the collar of the axis on which the screw is to be cut, solder it with tin, sal-ammoniac, and rosin, as exactly corresponding to the axis as possible. Take then a puppet with a hole cut into a corresponding female screw, into which the male screw is to be put. The axis on which the screw is to be cut must be placed exactly horizontally between the two puppets. The *rest* is then to be brought as near as possible to the place where the screw is to be cut, and a small hollow should be cut in that part of it which is exactly opposite to the place where the screw is to be cut, to hold your instrument firmly and prevent it from shaking. The instrument with which the screw is to be cut should be very sharp, and its point should make an angle of 60° with the screw to be cut; and if you wish the screw to be cut very deep, it should make an angle a little larger. The lathe being now put in motion, the tap fixed at the end of the axis will move gradually through the female screw in the puppet; and your instrument in the mean time will trace a similar male screw on the axis fixed in the lathe. Many persons, after having in this manner drawn the outlines of the screw, finish it with a screw-tale of three teeth corresponding exactly to the size of the screw, or with a triangular file; but this last method is rather improper.

This is the exactest method of cutting screws. There is another method described by F. Plumier, which may sometimes be of use. "Cut (says he) a small fillet of paper large enough to cover that part of the axis which you mean to cut into a screw; then mark upon the two borders of it, which join when it is rolled on the axis, the largeness

of the teeth of the screw with a compass. Having thus marked the whole border at equal distances, draw a straight line from the first point of the border to the second, from the second to the third, and so on. You will have several oblique parallel lines equally distant from one another. Wrap the fillet of paper thus marked upon the part of the axis on which the screw is to be traced, so that the borders of it touch without overlapping each other: then all the extremities of these lines meeting mutually, will trace out a very exact screw; and this you will mark upon the axis by means of a knife formed into a kind of fine saw by the edge of another knife. This first trace you are carefully to enlarge with a small file till it becomes large enough to admit the edge of a three-cornered file; with which you cut a little; then, taking a proper screw-tale, you introduce it into the hollows already made; and turning the lathe, you are to follow the hollow of the screw with this instrument till the screw is finished."

For turning ovals, a lathe of somewhat a different construction is used. The axis or spindle, having on it the pulley over which the band-cord passes for turning the lathe, is fixed between the two puppets so as to turn round easily; one end of it passes through one of the puppets, and to it is firmly fixed a circular plate of brass, so that it turns round along with the spindle. Upon this plate two brazen segments of circles are fastened, the circumferences of which correspond to the circumference of the plate: their chords are parallel, and equally distant from the centre of the plate, so that they leave a distance between them. They have a groove in each of them: in these grooves another plate is placed which exactly fills up the space between the two grooves, but is shorter than the diameter of the larger circular plate on which it is laid. This plate is made to slide in the grooves. To its centre is fixed a short spindle, on which the piece of wood to be turned is fixed. When the lathe is set a going, the circular plate moves round, and carries the piece along with it; the plate of brass on which the piece is fixed being fixed loosely in the grooves already described, slides down a little every time that the grooves become perpendicular to the floor (and there are particular contrivances to prevent it from sliding down too far); and by these two motions combined, the circular one of the large plate, and the straight one of the small, the circumference of the piece of wood to be turned necessarily describes an oval; and gouges or other tools being applied in the usual manner supported on the *rest*, it is cut into an oval accordingly. The small plate may be made to slide either more or less in the grooves; and by this contrivance the transverse diameter of the oval, or rather ellipse, may be made longer or shorter at pleasure. Another, and still simpler method, if possible, of turning ovals, is this: Take two ovals of metal, exactly of the size of the oval which you intend to make; fix them firmly on the spindle of the lathe so as to turn round with it: fix between them the wood to be turned; and then it is easy, by the help of chisels and other tools, to cut it, as the lathe goes into exactly the figure of the external ovals. Or an oval may be formed by placing the wood, or whatever is to receive that shape, obliquely on the lathe. There are several other ingenious methods of turning; but our bounds do not permit us to enter upon them. We shall therefore conclude this article with a number of receipts which every turner ought to know.

1. *The method of moulding boxes both of shell and horn.*—In the first place, form a proper mould, which must consist of two pieces, viz. of a circle about half an inch thick, which should slope a little in order to draw out the moulded shell the more easily; and a ring fitted to the outside

Turning. of the circle, so that both together make the shape of a box. These two pieces being adjusted, it is necessary to round the shell to be moulded of such a size that, when moulded, it will be a little higher than the ring of the mould, that there may be no deficiency. The mould is then to be put into a press on a plate of iron, exactly under the screw of the press; put then the shell upon the circle of the mould, so that its centre also is exactly opposite to the screw of the press: then take a piece of wood formed into a truncated cone, and not so thick as the diameter of the circle of the mould, nor so deep as the ring: then put a plate of iron above the cone, and screw down the press gently and cautiously till the whole is well fixed: then plunge the whole into a cauldron of boiling water placed above a fire. In 8 or 10 minutes the shell or horn will begin to soften; screw the press a little firmer that the wooden cone may sink into the softened shell: repeat this from time to time till the cone is quite sunk in the mould; then take out the press and plunge it into cold water. When it is cold, take the box now formed out of the mould, and put into the inside of it a new mould of tin exactly of the form you wish the inside of the box to be; do the same with the outside, put it again into the press and plunge it into boiling water; screw the press gradually till the box be fashioned as you desire.

2. *Method of preparing green wood so that it will not split in the turning.*—Having cut your wood into pieces of a proper size, put it into a vessel full of a ley made with wood ashes. Boil it there about an hour; then, taking the cauldron off the fire, allow the ley to cool; then take out the wood and dry it in the shade.

3. *Method of giving an ebony-black to hard and fine woods.*—After forming the wood into the destined figure, rub it with aquafortis a little diluted. Small threads of wood will rise in the drying, which you will rub off with pumice-stone. Repeat this process again, and then rub the wood with the following composition: Put into a glazed earthen vessel a pint of strong vinegar, two ounces of fine iron-filings, and half a pound of pounded galls, and allow them to infuse for three or four hours on hot cinders. At the end of this time augment the fire, and pour into the vessel four ounces of copperas (sulphat of iron), and a chopin of water having half an ounce of borax and as much indigo dissolved in it; and make the whole boil till a froth rises. Rub several layers of this upon your wood; and when it is dry, polish it with leather, on which you have put a little tripoli.

4. *Method of giving to plum-tree the colour of brazil wood.*—Slack lime with urine, and bedaub the wood over with it while it is hot: allow it to dry; then take off the coat of lime and rub it with shamoy skin well oiled. Or, steep your wood in water, having a quantity of alum dissolved in it: then, having allowed brazil wood to dissolve in water five or six hours, steep your wood in it, kept lukewarm during a night; and when it is dry, rub it, as before directed, with shamoy skin well oiled.

5. *Method of giving a fine black colour to wood.*—Steep your wood for two or three days in lukewarm water in which a little alum has been dissolved; then put a handful of logwood, cut small, into a pint of water, and boil it down to less than half a pint. If you then add a little indigo, the colour will be more beautiful. Spread a layer of this liquor quite hot on your wood with a pencil, which will give it a violet colour. When it is dry, spread on another layer; dry it again and give it a third: then boil verdigrise at discretion in its own vinegar, and spread a layer of it on your wood: when it is dry, rub it with a brush, and then with oiled shamoy skin. This gives a fine black, and imitates perfectly the colour of ebony.

6. *Method of cleaning and whitening bones before using them.* **Turning**
—Having taken off with a saw the useless ends of the bones, **Turquoise.** make a strong ley of ashes and quick lime, and into a pailful of this ley put four ounces of alum, and boil the bones in it for an hour; then take the vessel containing the ley off the fire and let it cool; then take out the bones and dry them in the shade.

7. *Method of soldering shells.*—Clean the two sides of the shells which you wish to join together; then, having joined them, wrap them up in linen folded double and well moistened; then heat two plates of iron pretty hot that they may keep their heat for some time; and putting your shells rolled up between them under a press, which you must screw very tight, leave them there till the whole is cold, and they will be soldered. If you do not succeed the first time, repeat the process.

8. *Method of moulding shells.*—Put six pints of water into a kettle; add to it an ounce of olive or other oil; make the water boil; then put in your shell, and it will grow soft. Take it out and put it into a mould under a press, and it will take the figure you want. This must be done quickly; for if the shell cool ever so little, the process will fail. It will not require much pressure.

9. *Method of tinging bones and ivory red.*—Boil shavings of scarlet in water. When it begins to boil, throw in a quarter of a pound of ashes made from the dregs of wine, which will extract the colour: then throw in a little rock alum to clear it, and pass the water through a linen cloth. Steep your ivory or bone in aquafortis, and put it into the water. If you wish to leave white spots, cover the places destined for them with wax.

10. *To tinge ivory black.*—Steep the ivory during five or six days in water of galls with ashes made with dried dregs of wine and arsenic; then give it two or three layers of the same black with which plum-tree is blackened, in order to imitate ebony. Or, dissolve silver in aquafortis, and put into it a little rose water. Rub the ivory with this, and allow it to dry in the sun.

11. *Method of hardening wood to make pulleys.*—After finishing the pulley, boil it seven or eight minutes in olive oil, and it will become as hard as copper.

12. *To make Chinese varnish.*—Take of gum lac in grains four ounces; put it into a strong bottle with a pound of good spirit of wine, and add about the bulk of a hazel nut of camphor. Allow them to mix in summer in the sun, or in winter on hot embers for 24 hours, shaking the bottle from time to time. Pass the whole through a fine cloth, and throw away what remains upon it. Then let it settle for 24 hours, and you will find a clear part in the upper part of the bottle, which you must separate gently and put into another vial, and the remains will serve for the first layers.

TURNSTONE, in ornithology. See TRINGA.

TURPENTINE, a transparent viscous substance, flowing either naturally or by incision from several unctuous or resinous trees; as the terebinthus, pine, larch, fir, &c. See PINUS, p. 765; CHEMISTRY-Index; MATERIA MEDICA, the Table.

Oil of TURPENTINE. See CHEMISTRY-Index, and PHARMACY, n° 174.

TURPETH, the cortical part of the root of a species of convolvulus, brought from the East Indies. It is accounted a pretty strong cathartic; but it is very uncertain in its strength, for sometimes a dose from a scruple to a dram purges violently, while at other times a much greater dose produces very little effect.

TURQUOISE, is the tooth of an animal penetrated with the blue calx of copper: it loses its colour when heated; it

Turritin it is opaque, and of a lamellar texture, and susceptible of a fine polish; its specific gravity is from 2,5 to 2,908; some are of a deep blue, some of a whitish blue, but become of a deeper when heated. This substance is found in Persia and Languedoc. The copper may be extracted from it by distilled vinegar. According to Reaumur (*Mem. Par.* 1715) nitrous acid will not dissolve that of Persia, though it will that of France, which shows a difference between them.

TURRETIN (Francis), minister and professor of divinity at Geneva, his native place, was born in 1623. Having studied at Geneva, Leyden, Saumur, Montauban, and Nismes, with great success, he was admitted into the ministry in 1648, and served at the same time the French and Italian churches at Geneva. Two years after, he was offered the professorship of philosophy, which he refused; but accepted the invitation of the church of Lyons. He was recalled to Geneva at a year's expiration, because he was wanted to give lectures in divinity; which he began in 1653. He was sent to Holland in 1661, to procure money which the city of Geneva had occasion for. He had in that journey all the success he could promise himself; and gained such a character there, that he was strongly importuned by the Walloon churches at the Hague and at Leyden to enter into their service. On his return he resumed the functions of his place, and continued there till his death with remarkable application. He died in 1687, with the character of a man of great merit; eloquent, judicious, laborious, learned, and zealous for orthodoxy. His works were published by his son John Alphonsus, in 3 and in 4 vols 4to.

TURRITIS, **TOWER-MUSTARD**, in botany: A genus of plants belonging to the class of *tetradynamia*, and to the order of *siliquosa*; and in the natural system ranging under the 39th order, *Siliquosa*. The siliqua is very long and angulated; the calyx connivent and erect; the corolla is also erect. There are three species; two of which are natives of Great Britain, the *glabra* and *hirsuta*.

TURTLE, in ichthyology. See **TESTUDO**.

TURTLE-DOVE, in ornithology. See **COLUMBA**.

TUSCAN ORDER, in architecture. See **ARCHITECTURE**, n° 42.

Tuscan Earth, a yellowish kind of bole dug in many parts of Italy, particularly about Florence, where there is a stratum of it eight or ten feet thick, at the depth of five or six feet from the surface. It is supposed to have an astringent property.

TUSCANY, a duchy of Italy, which makes part of the ancient Etruria, excepting some small detached parts, is encompassed by a part of the Mediterranean, called here the *Tuscan Sea*; the ecclesiastical state; the duchy of Modena; and the republic of Lucca; its extent from north to south being about 116 English miles, and from east to west about 80.

Though some parts of it are mountainous, yet both the hills and dales are covered with vines, olives, citron, lemon, and orange trees, &c. The mountains yield also copper, iron, alum, &c. and some quarries of the finest marble and porphyry. Here is also plenty of corn, rice, saffron, honey, wax, wool, flax, hemp, with mineral waters, rich pasture, salt-pits, sulphur, alabaster, chalcedony, lapis lazuli, borax, amethysts, cornelians, jaspers, quicksilver, crystals, and black slate. In some places the elms and ashes yield manna.

The principal river in Tuscany is the Arno, which has its source in the Appennine mountains, and falls into the sea below Pisa. There are some other smaller rivers.

This duchy fell under the dominion of the Romans about 455 years before Christ. The Ostrogoths possessed themselves of it in the fifth century, and after them the Lom-

bards, who were expelled by Charlemagne anno 800; in consequence of which it became subject to the German emperors, who appointed governors over it. At last the cities of Florence, Pisa, Sienna, and some others, during the contentions between the pope and the emperor, and their respective adherents, the Guelphs and Ghibelines, withdrew themselves from the dominion of both, and erected themselves into separate commonwealths. In that of Florence, John de Medicis, a popular nobleman, so insinuated himself into the favour of his countrymen, that they invested him with sovereign power. Pope Pius V. conferred the title of *grand duke* on Cosmo de Medicis anno 1570, in whose family the duchy continued until the death of Gaston de Medicis, who died anno 1737. The duchy was then transferred to the duke of Lorraine, afterwards the emperor Francis I. in lieu of the duchy of Lorraine, which, by the peace of 1736, was given to king Stanislaus during his life, and then was to be annexed to France. Leopold, the second son of Francis I. and afterwards emperor of Germany, succeeded to this duchy. It is now enjoyed by Leopold's second son, brother to the present emperor of Germany, Francis II. The grand duke's annual revenues are computed at about 500,000l. sterling, arising chiefly from the tenths of all estates that are sold or alienated, and the ground-rents of the houses in Leghorn; and the duties on almost all manner of provisions.

The great duke is absolute in his dominions. His standing forces consist only of three regiments of foot and two of dragoons, and his marine of a few galleys and galleasses; but, in case of necessity, it is said he can bring 30,000 men into the field, and increase his marine with 20 men of war; but it does not appear how he can man them.

The principal places are Florence, Pisa, Leghorn, Sienna, Orbitello, Piombino, and Arezzo.

TUSK, or **TORSK**, in ichthyology. See **GADUS**.

TUSSILAGO, **COLT'S FOOT**, in botany: A genus of plants belonging to the class of *syngenesia*, and order of *polygamia superflua*; and in the natural system ranging under the 49th order, *Compositae*. The receptacle is naked; the pappus simple; the scales of the calyx equal, of the same height as the disk, and somewhat membranaceous. There are 12 species; three of which are indigenous to Britain, the *farfara*, *hybrida*, and *petasites*.

The *farfara*, or common colt's foot, grows plentifully on the banks of rivulets, or in moist and clayey soils, in England and Scotland.—The leaves are smoked in the manner of tobacco, or a syrup or decoction of them and the flowers stand recommended in coughs and other disorders of the breast and lungs. It seems now to be almost entirely rejected. The downy substance under the leaves, boiled in a lixivium with a little saltpetre, makes excellent tinder. The *petasites*, or common butter-bur, is frequent in wet meadows and by the sides of rivers. Its leaves are the largest of any plant in Great Britain, and in heavy rains afford a seasonable shelter to poultry and other small animals. The root dug up in the spring is resinous and aromatic. A drachm of it in a dose has been sometimes given as a sudorific and alexipharmic; but as it possesses those virtues but in a small degree, it has lost its reputation in the shops.

TUTENAGO, an ore of zinc, containing commonly from 60 to 90 *per cent.* of zinc, the remainder iron, and a small proportion of clay.

TUTOR, in the civil law, is one chosen to look to the persons and estate of children left by their fathers and mothers in their minority. The different kinds of *tutary* established among the Romans, and the powers and duties of tutors, are described in *Inst. Leg.* 1. T. XIII. sect. 1. and 2. to which the reader is referred. See also the article **GUAR-**

Tuscany
||
Tutor.

Tutor
||
Twelfth-
Day.

DIAN.—For the nature and effects of tutory in the Scotch law, which is founded on that of the Romans, see *Scotch Law*, Part III. Sect. 7.

TUTOR is also used in the English universities for a member of some college or hall, who takes on him the instructing of young students in the arts and faculties.

TUTTY, an argillaceous ore of zinc, found in Persia, formed on cylindrical moulds into tubulous pieces, like the bark of a tree, and baked to a moderate hardness; generally of a brownish colour, and full of small protuberances on the outside, smooth and yellowish within, sometimes whitish, and sometimes with a bluish cast. Like other argillaceous bodies, it becomes harder in a strong fire; and after the zinc has been revived and dissipated by inflammable additions, or extracted by acids, the remaining earthy matter affords, with oil of vitriol, an aluminous salt.

Tutty is celebrated as an ophthalmic, and frequently employed as such in unguents and collyria. See *PHARMACY*, n° 654.

TWEED, a river of Scotland, which rises on the confines of the shire of Clydesdale, and running eastward thro' Tweedale, and dividing the shire of Merse from Teviotdale and Northumberland, falls into the German Sea at Berwick. It abounds with salmon.

TWEEDALE, or PEEBLES, a county in the south of Scotland. It has already been described under the word PEEBLES; but in that article several inaccuracies were committed, which a gentleman of that county has been kind enough to point out, and which therefore we take this opportunity of correcting.

Tweedale is chiefly a grazing county, producing excellent mutton from healthy black-faced sheep. It is remarkable, that among this particular breed the rot or dropical disease, and the trembling illness, are exceedingly rare, unless when they happen to be imported by stranger sheep.—The account which we formerly gave of the vast number of eels swarming in West-water Loch, and tumbling into the river Yarrow at particular seasons, is a mistake. At present no greater number of eels is seen there than in other rivers and lochs. This loch and Yarrow water are more than 20 miles asunder, and running different ways, so that the account at any rate was impossible. The lake on the borders of Annandale is at present called *Loch Skeen*, and not *Loch Gennet*; the cataract which it forms is called the *Grey Mare's Tail*: the fall is into Moffat water. Douglas of Cavers ought not to have been reckoned among the families of Tweedale, as that branch of the Douglasses belongs to a different county. Our mistake proceeded from this circumstance—In very ancient times all the country washed by the Tweed went by the name of *Tweedale*, and the Douglasses were wardens of that district. Peebles lies in N. Lat. 55. 38. W. Long. 3.

TWELFTH-DAY, the festival of the Epiphany, or the manifestation of Christ to the Gentiles; so called, as being

the twelfth day, exclusive, from the nativity or Christmas-day.

TWILIGHT, that light, whether in the morning before sun-rise, or in the evening after sun-set, supposed to begin and end when the least stars that can be seen by the naked eye cease or begin to appear.

TWINKLING of the STARS. See *OPTICS*, n° 21.

TWINS, two young ones delivered at a birth, by an animal which ordinarily brings forth but one.

TWITE, in ornithology. See *FRINGILLA*.

TYGER, or TIGER, in zoology. See *FELIS*.

TYLE, or TILE, in building, a sort of thin laminated brick used on the roofs of houses: or, more properly, a kind of fat clayey earth kneaded and moulded of a just thickness, dried and burnt in a kiln like brick, and used in the covering and paving of houses.

TYMPAN, among printers, a double frame belonging to the press, covered with parchment, on which the blank sheets are laid in order to be printed off. See *PRINTING-PRESS*.

TYMPANUM, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed staves for the more easily turning the axis in order to raise a weight required. The tympanum is much the same with the peritrochium; but that the cylinder of the axis of the peritrochium is much shorter and less than the cylinder of the tympanum.

TYMPANUM, in anatomy. See *ANATOMY*, n° 141.

TYMPANY, in medicine. See *MEDICINE*, n° 337, and *SURGERY*, n° 265.

TYNDALE (William), a zealous English reformer, and memorable for having made the first English version of the Bible, was born on the borders of Wales some time before 1500. He was of Magdalene-hall in Oxford, where he distinguished himself by sucking in early the doctrines of Luther, and by as zealously propagating those doctrines among others. Afterwards he removed to Cambridge, and from thence went to live with a gentleman in Gloucestershire in the capacity of tutor to his children.—While he continued there, he showed himself so furious for Luther, and so inveterate to the pope, that he was forced, merely for the security of his person, to leave the place. He next endeavoured to get into the service of Tonsall bishop of Durham, but did not succeed. His zeal for Lutheranism made him desirous to translate the New Testament into English; and as this could not safely be done in England, he went into Germany, where, setting about the work, he finished it in 1527. He then began with the Old Testament, and finished the five books of Moses, prefixing discourses to each book, as he had done to those of the New Testament (A). At his first going over into Germany, he went into Saxony, and had much conference with Luther; and then returning to the Netherlands, made his abode chiefly at Antwerp.

Jortin's
Life of
Erasmus.

(A) An anecdote is told of Bishop Tonsal, which is amusing in itself, and does much honour to the Bishop's moderation. Tonsal being at Antwerp in 1529, he sent for one Packington an English merchant there, and desired him to see how many New Testaments of Tyndale's Translation he might have for money. Packington, who was a secret favourer of Tyndale, told him what the Bishop proposed. Tyndale was very glad of it; for, being convinced of some faults in his works, he was designing a new and more correct edition: but he was poor, and the former impression not being sold off, he could not go about it: so he gave Packington all the copies that lay in his hands; for which the Bishop paid the price, and brought them over, and burnt them publicly in Cheap-side.—Next year, when the second edition was finished, many more were brought over; and one Constantine being taken in England, the lord chancellor, in a private examination, promised him that no hurt should be done him if he would reveal who encouraged and supported them at Antwerp; which he accepted of, and told them that the greatest encouragement they had was from the Bishop of London, who had bought up half the impression. This made all that heard of it laugh heartily, though more judicious persons discerned the great temper of that learned Bishop in it.

Tyndale,
Type.

werp. During his peregrinations from one country to another, he suffered shipwreck upon the coast of Holland, and lost all his books and papers. His translations of the Scriptures being in the mean time sent to England, made a great noise there; and, in the opinion of the clergy, did so much mischief, that a royal proclamation was issued out, prohibiting the buying or reading such translation or translations. But the clergy were not satisfied with this, they knew Tyndale capable of doing infinite harm, and therefore thought of nothing less than removing him out of the way. For this purpose one Philips was sent over to Antwerp, who insinuated himself into his company, and under the pretext of friendship betrayed him into custody. He was sent to the castle of Filford, about 18 miles from Antwerp; and though the English merchants at Antwerp did what they could to procure his release, and letters were also sent from lord Cromwell and others out of England, yet Philips bestirred himself so heartily, that he was tried and condemned to die. He was first strangled by the hands of the common hangman, and then burned near Filford castle, in 1536. While he was tying to the stake, he cried with a fervent and loud voice, "Lord, open the king of England's eyes."

TYPE (*τύπος*), an impression, image, or representation of some model, which is termed the *antitype*. In this sense the word occurs often in the writings of divines, who employ it to denote that prefiguration of the great events of man's redemption which they have found or fancied in the principal transactions recorded in the Old Testament.

That the death of Christ for the sins of men, and his resurrection from the dead for their justification, were prefigured in the ritual worship instituted by Moses, is indeed incontrovertible*; but when divines consider as a type every thing mentioned in the Hebrew Scriptures, in which an active imagination can discover the slightest resemblance or analogy to any circumstance in the life, or death, or resurrection, of Christ, they expose the whole doctrine of *types* to the ridicule of unbelievers, and do a real injury to that cause which it is their professed intention to serve. To contend, as some of them have done, that the extraction of Eve from the side of Adam, while he was in a deep sleep, was intended as a type of the Roman soldier's piercing our Saviour's side while he slept the sleep of death; or that the envy of the sons of Jacob to their brother Joseph, was typical of the envy of the Scribes and Pharisees to Jesus the Messiah, is to burlesque the Scriptures, and insult reason.

The nature of types seems indeed to be very little understood even by those who pretend to have studied them with care. They are generally compared to prophecies having a double sense, and are thought to have been so contrived as to give information of the future events to which they pointed; but the information which they gave of Christianity must have been exceedingly obscure to those who lived before the coming of Christ, however plain it may appear to us who can now compare the type with the antitype. A different opinion has indeed been maintained, not only by mystical cabbalists, who will maintain any thing from which common sense revolts, but also by writers who, when treating of other subjects, have shown that they possessed very sound understandings. One of the ablest defenders of revelation, speaking of the purpose for which the passover was instituted, asks, "What is the price and worth of a lamb, whose blood infallibly gives life to those who are tinged with it, and the non-asperion or neglect of which is sufficient to condemn Jew and Gentile to death without distinction?" Taking it for granted that this question is capable of no answer but one favourable to the conclusion which he wishes to draw from it, he then proceeds in the following words: "Though the Messiah was not already

come, who could doubt but that such a mystery *typified him*, since he was to be the Saviour and Deliverer of his people? and who would not be prepared to believe that he will deliver his people, and save them by the *effusion of his blood*, when it is obvious that it is to the immolation of a lamb, and the asperion of its blood, that all Israel owe their lives and liberties?"

That the sacrifice of the paschal lamb for the safety of the Israelites was typical of the sacrifice of the Lamb of God for the sins of the world, and that the resemblance or analogy of the type to the antitype was in many respects exceedingly striking, are facts known to every Christian; but they could not possibly be known to the ancient Hebrews before it was revealed to them that Christ was to suffer. At the institution of the passover, nothing was said from which the great body of the people could infer that they were to be redeemed from death and sin by the blood of the Messiah, as their fathers had in Egypt been delivered from the destroying angel by the blood of the immolated lamb. We readily agree with the ingenious writer, that in the blood of a lamb there is no worth to propitiate the eternal God, and from him to purchase life for the man who is sprinkled with it; but the Israelites, at the era of their departure from Egypt, held opinions very different from his and ours. They thought grossly of the Deity, and believed, with their superstitious masters, that he put the highest value on animal sacrifices. In the New Testament Christ is called our *Passover*, and said to have been sacrificed for us. Christians therefore cannot doubt but that the Jewish sacrifice of the paschal lamb was emblematical of the great sacrifice slain on the cross; but as the majority of the ancient Hebrews were ignorant of all the circumstances of resemblance between the type and antitype, we cannot conceive how they should have dreamed of a future passover of which their own was but an empty figure.

Some learned men indeed seem to imagine, that when the rites of the law were instituted, the people were taught to consider them as of no value in themselves, but merely as shadows of good things to come, and that by means of these shadows a distinct and even steady view was given to them of the substance; but this is a supposition which receives no support from Scripture. That Abraham, who rejoiced to see Christ's day, and seeing it was glad; that Moses, who was directed to make all things relating to the tabernacle according to the pattern showed to him in the mount; and that such other individuals as, like him, could look up to a God invisible, and perform at once a worship purely spiritual; that these men were admonished that the ritual law was only the shadow of a future and more perfect dispensation—cannot, we think, be questioned. Nay, that Abraham, Moses, and a few others, may have had as accurate notions of Christianity as we have at present, is a position which we feel not ourselves inclined to controvert; but that the great body of the Hebrew nation was taught from the beginning to consider their law as imperfect, or as deriving any little value which it had from its being emblematical of a purer worship to be revealed in the fulness of time, is a supposition which cannot be admitted without confounding all the divine dispensations.

The law was a schoolmaster given to the posterity of Jacob, to guard them from idolatry, and to train them by degrees for the coming of Christ. That it might answer this purpose the more effectually, prophets were raised up from time to time to point out its secret and spiritual meaning, as the people became able to receive it; and no reason can be assigned for the introduction of so burdensome and carnal a ritual between the fall and the clear revelation of redemption, but because mankind at large were not at that period

Type.

Lally's
Principles of
the Christian
Religion.

* See *Epist.
to the Heb.*
passim.

Type
Typhon.

period capable of a more spiritual and refined worship. See THEOLOGY, Part II. Sect. iv.

If this be so, how absurd is it to suppose that the ancient Israelites saw through their sacrifices the future sacrifice of Christ, and the simple, though sublime, worship of the Christian church; that when their law promised temporal rewards to the obedient, they looked for heavenly ones through the Messiah; and that when they were offering a sin-offering for their transgressions, they had their eyes fixed on the cross of Christ, being aware that the blood of bulls and of goats could never take away sin? Had the Israelites, at their deliverance from Egyptian bondage, been capable of all this faith, it is not to be supposed that the Father of Mercies would have laid upon them such a yoke of ordinances; for that would have been in effect to say, though you are capable of worshipping me in spirit and in truth, according to the dispensation which shall be revealed to your posterity, yet I command you to observe a multifarious ritual, which you *know* to be preparatory to that dispensation, and of *no real value in itself*!

The law therefore had only the *shadow* of good things to come, and not such an image of them, as that merely from beholding the type mankind could acquire an accurate notion of the antitype. It was indeed so contrived as naturally to lead the thinking part of the nation to the hopes of future redemption; but without the illustrations of the prophets it could not of itself have made them comprehend the means by which that redemption was to be effected. Between the types and the antitypes, the shadow and the substance, the resemblance, or, to speak more properly, the analogy, is so striking, that no unprejudiced person can now entertain a doubt but that the law and the gospel are parts of one great scheme of providence, which, commencing with the fall, was completed by the effusion of the Holy Spirit on the day of pentecost. But it would be as equitable to condemn a Bacon or a Newton to spend his time in the amusements of children, as it would have been to place the Jews under the ritual law, had they been capable of acquiring from the shadows of that law adequate notions of the substance of Christianity.

TYPE, among letter-founders and printers, the same with letter. See LETTER.

TYPE is also used to denote the order observed in the intensification and remission of fevers, pulses, &c.

TYPHA, Cat's TAIL, in botany: A genus of plants belonging to the class of *monocia*, and order of *triandria*; and in the natural system ranging under the 3d order, *Calamaria*. The amentum of the male flower is cylindrical; the calyx is tripetalous, but scarcely distinguishable; there is no corolla. The female has a cylindrical amentum below the male; the calyx is composed of villous hair; there is no corolla, and only one seed fixed in a capillary pappus. There are two species, both natives of Britain; the *latifolia* and *angustifolia*.

1. *Latifolia*, great cat's tail, or reed mace, is frequent in ponds and lakes. The stalk is six feet high; the leaves a yard long, hardly an inch wide, convex on one side: the amentum, or cylindrical club, which terminates the stalk, is about six inches long, of a dark brown or fuscous colour. Cattle will sometimes eat the leaves, but Schreber thinks them noxious: the roots have sometimes been eaten in salads, and the down of the amentum used to stuff cushions and mattresses. Linnæus informs us, that the leaves are used by the coopers in Sweden to bind the hoops of their casks.

2. *Angustifolia*, narrow-leaved cat's tail, is found in pools and ditches. The leaves are semi-cylindrical, and the male and female spike are remote and slender.

TYPHON. See WHIRLWIND.

TYPHON, the devil of the ancient Egyptians. See POLYTHEISM, n° 29.

TYPOGRAPHY, the art of printing. See PRINTING.

TYRANNION, a celebrated grammarian in Pompey's time, was of Amisus in the kingdom of Pontus. He was the scholar of Dionysius of Thrace at Rhodes. He fell into the hands of Lucullus, when that general of the Roman army defeated Mithridates, and seized his dominions. This captivity of Tyrannion was no disadvantage to him, since it procured him an opportunity of being illustrious at Rome, and raising a fortune. He spent it, among other things, in making a library of above 30,000 volumes. He died very old, being worn out with the gout. His care in collecting books contributed very much to the preservation of Aristotle's works.

TYRANT, among the ancients, denoted simply a king or monarch; but the ill use which several persons invested with that sacred character made of it, has altered the import of the word; and tyrant now carries with it the idea of an unjust or cruel prince, who invades the people's liberty, and rules in a more despotic manner than the laws of nature or of the country allow.

TYRE, formerly a celebrated city of Asia, on the coast of Syria, situated under the 34th degree of east longitude, and 32d of north latitude. It was built, according to some writers, 2760 years before the Christian era. There were two cities of that name; the one called *Palatyrus*, situated on the continent; and the other the city of *Tyre*, built on an island about half a mile from the shore. It was about 19 miles in circumference, including *Palatyrus*; the town on the island was about four miles round. The buildings of Tyre were very magnificent; the walls were 150 feet high, and broad in proportion. This city was at one period the most famous commercial city in the world. Of its commercial transactions, the most particular account that is to be found in any ancient writer has been given by the prophet Ezekiel, which at the same time conveys a magnificent idea of the extensive power of that state. It resisted Nebuchadnezzar king of Babylon for 13 years; at the end of which, wearied with endless efforts, the inhabitants resolved to place the sea between them and their enemy, and passed accordingly into the island. The new city stood out against Alexander the Great for seven months; and before he could take it, he was obliged to fill up the strait which separated the island from the continent. It was repaired afterwards by Adrian, and became the metropolis of the province. It afterwards fell into the hands of the Arabs; and after being taken by Baldwin II. king of Jerusalem, it was destroyed by the sultan of Egypt in 1289, and abandoned, never more to rise from its ruins. An excellent account of its situation and modern state may be found in Volney's Travels, vol. ii. It now consists of a small village, composed of wretched huts, containing about 50 or 60 poor families. The words of Ezekiel are literally fulfilled, "And they shall make a sport of their riches." (Ezek. xxvi. 12, 13, 14). Mr Bruce saw this queen of the nations converted into a place for fishers to dry their nets in. Its harbour, formerly so famous for its shipping, is now almost choked up. It is called *Sour* or *Tfour* by the Orientals.

TYRIAN DYE. See MUREX and PURPURA.

TYRONE, a county of Ireland, in the province of Ulster, 46 miles in length and 37 in breadth; bounded on the north by Londonderry, on the east by Armagh and Lough-Neagh, on the south by Fermanagh, and on the west by Donnegal. It is a rough and rugged country, but tolerably fruitful; contains 12,683 houses, 30 parishes, 4 baronies, 4 boroughs, and sends 10 members to parliament. The principal town is Dungannon.

Typhon
Tyran.

U, V.

Vaccinum.

U, or **u**, the 20th letter and 5th vowel of our alphabet, is formed in the voice by a round configuration of the lips, and a greater extrusion of the under one than in forming the letter **o**, and the tongue is also more cannulated. The sound is short in *curst*, *must*, *tun*, *tub*; but is lengthened by a final *e*, as in *tune*, *tube*, &c. In some words it is rather acute than long; as in *brute*, *flute*, *lute*, &c. It is mostly long in polysyllables; as in *union*, *curious*, &c. but in some words it is obscure, as in *nature*, *venture*, &c. This letter in the form of **V** or **v**, is properly a consonant, and as such is placed before all the vowels; as in *vacant*, *venal*, *vibrate*, &c. Though the letters **v** and **u** had always two sounds, they had only the form **v** till the beginning of the fourth century, when the other form was introduced, the inconvenience of expressing two different sounds by the same letter having been observed long before. In numerals **V** stands for five; and with a dash added at top, thus **V̄**, it signifies 5000.

In abbreviations, amongst the Romans, **V. A.** stood for *veterani assignati*; **V. B.** *viro bono*; **V. B. A.** *vir boni arbitratu*; **V. B. F.** *vir bonæ fidei*; **V. C.** *vir consularis*; **V. C. C. F.** *vale, conjux charissime, feliciter*; **V. D. D.** *voto dedicatur*; **V. G.** *verbi gratia*; **Vir. Ve.** *virgo vestalis*; **VL.** *videlicet*; **V. N.** *quinto nonarum*.

VACCINIUM, the WHORTLE-BERRY, or *Bilberry*, in botany: A genus of plants of the class of *ostandria*, and order of *monogynia*; and arranged in the natural system under the 18th order, *Bicornes*. The calyx is superior; the corolla monopetalous; the filaments inserted into the receptacle; the berry quadrilocular and polyspermous. There are 15 species; the most remarkable of which are,

1. The *myrtillus*, black-whorts, whortle-berries, or bilberries, growing in woods and on heaths abundantly. The flowers frequently vary, with five segments at the rim, and with ten stamina. The berries when ripe are of a bluish black colour; but a singular variety, with white berries, was discovered by the duke of Athol, growing in the woods, about mid-way between his two seats of Dunkeld and Blair. The berries have an astringent quality. In Arran and the Western Isles they are given in diarrhoeas and dysenteries with good effect. The Highlanders frequently eat them in milk, which is a cooling agreeable food; and sometimes they make them into tarts and jellies, which last they mix with whisky, to give it a relish to strangers.— They dye a violet colour; but it requires to be fixed with alum. The grouse feed upon them in the autumn.

2. The *uliginosum*, or great bilberry-bush, is found in low moist grounds, and almost at the summits of the Highland mountains. The leaves are full of veins, smooth and glaucous, especially on the under side; the berries are eatable, but not so much esteemed as the preceding; as they are apt, if eaten in any quantity, to give the headach.

3. The *vitis idæa*, or red whortle-berries, frequent in dry places, in heaths, woods, and on mountains. The berries have an acid cooling quality, useful to quench the thirst in fevers. The Swedes are very fond of them made into the form of a rob or jelly, which they eat with their meat as an agreeable acid, proper to correct the animal alkali.

4. The *oxycoccus*, cran-berries, moss berries, or moor-berries, frequent on peat-bogs in the Lowlands, but not so common in the Highlands of Scotland. The stalks are

long, slender, woody, weak, and trailing; the leaves are stiff, acutely oval, glaucous underneath, their edges turned back, and grow alternate; two or three flowers grow singly on long red footstalks out of the extremity of the branches; the flowers are red, divided deeply into four acute segments, which are reflexed quite backwards; the filaments are downy; the antheræ ferruginous and longer than the filaments: the berries red, and about the size of the hawthorn berries. At Longtown, on the borders of Cumberland, they are made so considerable an article of commerce, that, at the season when they are ripe, not less than 20 l. or 30 l.'s worth are sold by the poor people each market-day for five or six weeks together, which are afterwards dispersed over different parts of the kingdom for making the well-known cranberry tarts.

VACUUM, in philosophy, denotes a space empty or devoid of all matter or body.

It has been a matter of much dispute among philosophers whether there be in nature a perfect vacuum, or space void of all matter; but if bodies consist of material solid atoms, it is evident that there must be vacuities, or motion would be impossible (See METAPHYSICS, n^o 193). We can even produce something very near a vacuum in the receiver of an air pump and in the Torricellian tube (see PNEUMATICS, *passim*); and it is very doubtful whether the particles of the densest bodies known be in perfect contact. See OPTICS, n^o 63—68.

VADIUM, a pledge in law, is either *vivum* or *mortuum*.

VADIUM Vivum, or *Living Pledge*, is when a man borrows a sum (suppose 200 l.) of another; and grants him an estate, as of 20 l. *per annum*, to hold till the rents and profits shall repay the sum so borrowed. This is an estate conditioned to be void as soon as such sum is raised. And in this case the land or pledge is said to be living: it subsists, and survives the debts; and, immediately on the discharge of that, reverts back to the borrower.

VADIUM Mortuum, or *Dead Pledge*. See MORTGAGE.

VAGABOND, or **VAGRANT**, one who wanders illegally, without a settled habitation. Such persons are cognizable by the laws. See IDLENESS.

VAGINA, properly signifies a sheath or scabbard; and the term *vagina* is used in architecture for the part of a terminus, because resembling a sheath out of which the statue seems to issue.

VAGINA, in anatomy, a canal reaching from the external orifice, or os pudendi, of women, to the uterus.

VAILLANT (John Foy), a physician and great medalist, to whom, according to Voltaire, France was indebted for the science of medals, and Louis XIV. for one half of his cabinet, was born at Beauvais in 1632. Through the means of the minister Colbert he travelled into Italy, Greece, Egypt, and Persia, to collect medals for the royal cabinet; and returned with so many as made the king's cabinet superior to any in Europe. In one of his voyages the ship he sailed in was fallen upon and taken by an Algerine corsair. After a captivity of near five months he was permitted to return to France, and received at the same time 20 gold medals which had been taken from him. He embarked in a vessel bound for Marseilles, and was carried on with a favourable wind for two days, when another corsair appeared, which, in spite of all the sail they could make, bore down upon them within the reach of cannon-shot. Mr

Vaillant

Vacuum

Vaillant.

Vair
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Valencia.

Vaillant, dreading the miseries of a fresh slavery, resolved, however, to secure the medals which he had received at Algiers, and in order thereto swallowed them. But a sudden turn of the wind freed them from this adversary, and cast them upon the coasts of Catalonia; where, after expecting to run aground every moment, they at length fell among the sands at the mouth of the Rhone. Mr Vaillant got to shore in a skiff, but felt himself extremely incommoded with the medals he had swallowed, which might weigh altogether five or six ounces, and therefore did not pass like Scarborough waters. He had recourse to a couple of physicians, who were a little puzzled with the singularity of his case; however, nature relieved him from time to time, and he found himself in possession of the greatest part of his treasure when he got to Lyons. Here he explained, with much pleasure to his friends, those medals which were already come to hand, as well as those which were daily expected; among which last was an Otho, valuable for its rarity.—He was much caressed on his return; and when Louis XIV. gave a new form to the academy of inscriptions in 1701, Mr Vaillant was first made associate, and then pensionary. He wrote several works relating to ancient coins, and died in 1706.

VAIR, or VAIRE, a kind of fur, formerly used for lining the garments of great men and knights of renown. It is represented in engraving by the figures of little bells reversed, ranged in a line. See HERALDRY, Chap. II. Sect. 2.

VAIRY, in heraldry, expresses a coat, or the bearings of a coat, when charged or chequered with vairs.

VALAIS, a valley in Switzerland, which extends from the source of the river Rhone to the lake of Geneva. It is near 100 miles in length, but the breadth is very unequal. It is bounded on the north by the Alps, which separate it from the cantons of Bern and Uri, on the east by the mountains of Forche, on the south by the duchy of Milan and the Val d'Aoste, and on the west by Savoy and the republic of Geneva. The inhabitants profess the Roman Catholic religion, and are subject to the swelling of the throat called *bronchocoele*; and idiots are said to abound among them more than in any other place of the globe. They are naturally hardy, enterprising, and good-natured. It is surrounded on all sides by very high mountains, most of which are covered with snow and ice that never thaw. However, the soil is fertile in corn, wine, and good fruit. The muscat-wine, which is produced here, is excellent, and well known all over Europe. There are mineral waters, plenty of game, and some mines. This country comprehends 55 large parishes, to which one bishop only belongs, whose see is at Sion the capital. The mountains afford good pasture for their cattle in summer, and their harvest continues from May to October; it being sooner or later according to the situation of the place.

VALANTIA, in botany: A genus of plants in the order *monocia*, of the class *polygamia*, and in the natural system arranged under the 41st order, the *asperifoliae*. There is scarcely any calyx; the corolla is monopetalous, flat, four-parted; the stamina four, with small antheræ; the hermaphrodite flowers have a pistillum with a large germen, a bifid style, the length of the calyx, and one seed; the pistilla of the male flowers are hardly discernible. There are eight species, only one of which is a native of Britain, the *cruciata*; the stalks of which are square, the whole plant hairy, the leaves oval and verticillate, four in a whirl; the flowers are yellow, and grow on short peduncles out of the axæ of the leaves. The roots, like those of the galiums, to which it is nearly related, will dye red. It is astringent, and was once used as a vulnerary.

VALENCIA, a province of Spain, which has the title

of a kingdom; and is bounded on the east and south by the Mediterranean sea, on the north by Catalonia and Arragon, and on the west by New Castile and the kingdom of Murcia. It is about 165 miles in length, and 63 in breadth. It is one of the most populous and agreeable parts of Spain, and where they enjoy almost a perpetual spring. The great number of rivers wherewith it is watered renders it extremely fertile, particularly in fruits and wine. There are very rugged mountains in it, which contain mines of alum and other minerals.

VALENCIA, a city of Spain, and capital of the kingdom of the same name. It contains about 12,000 houses, besides those of the suburbs and the summer-houses round it. It has an university, and an archbishop's see; and was taken from the Moors by the Christians in the 13th century. The town is handsome, and adorned with very fine structures. It is not very strong, though there are some bastions along the sides of the walls. They have manufactures in wool and silk, which bring in great sums to the inhabitants. It is seated on the river Guadalaviar, over which there are five handsome bridges; and it is about three miles from the sea, where there is a harbour, 110 miles north of Murcia, and 165 east by south of Madrid. This city surrendered to the earl of Peterborough in the year 1705; but it was lost again in 1707. W. Long. 0. 10. N. Lat. 39. 23.

VALENCIENNES, an ancient, strong, and considerable city of France, in the department of the North and late province of Hainault. It contains about 20,000 souls. The Scheld divides it into two parts. It is a very important place: the citadel and fortifications, the work of Vauban, were constructed by order of Louis XIV. who took this town from the Spaniards. It was confirmed to him by the treaty of Nimeguen, in 1678. In 1793, it surrendered to the allies after a severe siege, but was afterwards abandoned; and is now in the possession of the French republicans. Besides lace, this city is noted for manufactories of woollen stuffs and very fine linens. It is 20 miles west-south-west of Mons, 17 north-east of Cambray, and 120 north-east by north of Paris. E. Long. 3. 37. N. Lat. 50. 21.

VALENS (Flavius), emperor of the East, a great patron of the Arians. Killed by the Goths in the year 379. See CONSTANTINOPLE, n° 76.

VALENTINIAN I. emperor of the West, a renowned warrior, but a tyrant over his subjects. See ROME, n° 523.

VALENTINIAN II. emperor of the West, a prince celebrated for his virtues, and above all for his moderation; yet a conspiracy was formed against him by Arbogastes, the commander in chief of his armies; and he was strangled in the year 392. See ROME, n° 536.

VALENTINIANS, in church history, a sect of Christian heretics, who sprung up in the second century, and were so called from their leader Valentinus.

The Valentinians were only a branch of the Gnostics, who realized or personified the Platonic ideas concerning the Deity, whom they called *Pleroma* or *Plenitude*. Their system was this: the first principle is Bythos, i. e. Depth, which remained many ages unknown, having with it Ennoe or Thought, and Sige or Silence; from these sprung the Nous or Intelligence, which is the only son, equal to and alone capable of comprehending the Bythos; the sister of Nous they called *Aletheia* or *Truth*; and these constituted the first quaternity of æons, which were the source and original of all the rest: for Nous and Aletheia produced the World and Life; and from these two proceeded Man and the Church. But besides these 8 principal æons, there were 22 more; the last of which, called *Sophia*, being desirous to arrive at the knowledge of Bythos, gave herself a great deal of uneasiness, which

Valencia
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Valentinians

Valerian
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Valerius.

which created in her Anger and Fear, of which was born Matter. But the Hóros or Bounder stopped her, preserved her in the Pleroma, and restored her to Perfection. Sophia then produced the Christ and the Holy Spirit, which brought the æons to their last perfection, and made every one of them contribute their utmost to form the Saviour. Her Enthymese, or Thought, dwelling near the Pleroma, perfected by the Christ, produced every thing that is in the world by its divers passions. The Christ sent into it the Saviour, accompanied with angels, who delivered it from its passions, without annihilating it: from thence was formed corporeal matter. And in this manner did they romance concerning God, nature, and the mysteries of the Christian religion.

VALERIAN, or VALERIANUS, (Publius Licinius), emperor of Rome, remarkable for his captivity and cruel treatment by Sapor I. king of Persia. See ROME, n° 491.

VALERIANA, in botany: A genus of plants belonging to the class *triandria* and order *monogynia*, and in the natural system arranged under the 48th order, *aggregatæ*. There is hardly any calyx; the corolla is monopetalous, gibbous at the base, situated above the germen; there is only one seed. There are 21 species, only four of which are natives of Britain, the *officinalis*, the *locusta*, the *rubra*, the *dioica*; of these only the *officinalis* is useful. The root of this plant is perennial: the stalk is upright, smooth, channelled, round, branched, and rises from two to four feet in height: the leaves on the stem are placed in pairs upon short broad sheathes; they are composed of several lance-shaped, partially dentated, veined, smooth pinnæ, with an odd one at the end, which is the largest: the floral leaves are spear-shaped and pointed; the flowers are small, of a white or purplish colour, and terminate the stem and branches in large bunches. It flowers in June, and commonly grows about hedges and woods.

Woodville's
Medical Bo-
tany.

It is supposed to be the *ov* of Dioscorides and Galen, by whom it is mentioned as an aromatic and diuretic: it was first brought into estimation in convulsive affections by Fabius Columna, who relates that he cured himself of an epilepsy by the root of this plant: we are told, however, that Columna suffered a relapse of the disorder; and no further accounts of the efficacy of valerian in epilepsy followed till those published by Dominicus Panarolus fifty years afterwards, in which three cases of its success are given. To these may be added many other instances of the good effects of valerian root in this disease, since published by Cruger, Schuchmann, Riverius, Sylvius, Marchant, Chomel, Sauvages, Tissot, and others.

The advantages said to be derived from this root in epilepsy caused it to be tried in several other complaints termed *nervous*, particularly those produced by increased mobility and irritability of the nervous system, in which it has been found highly serviceable. Bergius states its virtues to be antispasmodic, diaphoretic, emmenagogue, diuretic, anthelmintic. The root in substance is most effectual, and is usually given in powder from a scruple to a dram: its unpleasant flavour may be concealed by a small addition of mace. A tincture of valerian in proof spirit and in volatile spirit are ordered in the London Pharmacopœia. — Cats are very fond of the smell of this root, and seem to be intoxicated by it.

VALERIUS MAXIMUS, a Latin historian, sprung from the families of the Valerii and Fabii, which made him take the name of *Valerius Maximus*. He studied polite literature, and afterwards followed Sextus Pompey to the wars. At his return he composed an account of the actions and remarkable sayings of the Romans and other great men; and dedicated that work to the emperor Tiberius. Many of the learned think that this is the same that is now extant, and bears the name of *Valerius Maximus*; but others maintain, that

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what we have now is only an abridgment of the work written by this celebrated historian, and that this abridgment was made by one Nepotian of Africa. However, this work is well written, and contains a great number of memorable actions performed by the Greeks and Romans that are worthy of being read.

VALET, a French term, used as a common name for all domestic men-servants employed in the more servile offices, as grooms, footmen, coachmen, &c. But with us it is only used in the phrase *valet de chambre*, which is a servant whose office is to dress and undress his master, &c.

VALETTA, a city of Malta, and capital of the island (see MALTA, n° 26). It is situated in E. Long. 14. 34. N. Lat. 35. 54.

VALETUDINARY, among medical writers, denotes a person of a weak and sickly constitution, and frequently out of order.

VALID, in law, an appellation given to acts, deeds, transactions, &c. which are clothed with all the formalities requisite to their being put into execution, and to their being admitted in a court of justice.

VALLADOLID, an ancient, large, and handsome city of Spain, in Old Castile, and capital of a principality of the same name, with a bishop's see and an university. It is surrounded with strong walls, embellished with handsome buildings, large public squares, piazzas, and fountains. It is large and populous, containing 11,000 houses, with fine long and broad streets, and large high houses, adorned with balconies. The market-place, called *El Campo*, is 700 paces in circumference, surrounded with a great number of convents, and is the place where the fairs are kept. There is another square in the middle of the city, surrounded with handsome brick houses, having under them piazzas, where people may walk dry in all weathers. Within these piazzas merchants and tradesmen keep their shops. All the houses are of the same height, being four stories; and there are balconies at every window, of iron gilt. In the whole there are 70 monasteries and nunneries; the finest of which is that of the Dominicans, remarkable for its church, which is one of the most magnificent in the city. The kings resided a long while at this place; and the royal palace, which still remains, is of very large extent, though but two stories high; within are fine paintings of various kinds, and at one of the corners a curious clock, made in the same manner as that of Strasburg. The house of the inquisition is an odd sort of structure, for there are no windows, but a few holes to let in the light. The environs of the city are a fine plain, covered with gardens, orchards, vineyards, meadows, and fields. It is seated on the rivers *Escurva* and *Pesuega*, in W. Long. 4. 25. N. Lat. 41. 50.

VALUE, in commerce, denotes the price or worth of any thing.

VALVE, in hydraulics, pneumatics, &c. is a kind of lid or cover of a tube or vessel so contrived as to open one way, but which, the more forcibly it is pressed the other way, the closer it shuts the aperture; so that it either admits the entrance of a fluid into the tube or vessel, and prevents its return; or admits its escape, and prevents its re-entrance.

VALVE, in anatomy, a thin membrane applied on several cavities and vessels of the body, to afford a passage to certain humours going one way, and prevent their reflux towards the place from whence they came.

VAMPYRE, a species of bat. See VESPERTILIO.

VAN, a term derived from the French *avant*, or *avaunt*, signifying before or foremost of any thing; thus we say, the van-guard of the army, &c.

VANBRUGH (Sir John), a celebrated English dramatic writer and architect, was descended of a family in Cheshire

Valet
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Vanbrugh.

Vandellia
||
Vandyck

shire which came from France, though by his name he appears to have been originally of Dutch extraction. He was born about the middle of the reign of Charles II. and received a liberal education. His first comedy, called the *Relapse*, or *Virtue in Danger*, was acted in the year 1697 with great applause; which gave him such encouragement, that he wrote eleven more comedies. He was the friend of Mr Congreve, whose genius was naturally turned for dramatic performances; and these two gave new life to the English stage, and restored its reputation, which had been for some time sinking; but their making vicious persons their most amiable and striking characters, and their bordering too much on obscenity, could be of no service to the cause of virtue; and therefore it was not without reason that they were attacked by Mr Collier, in his piece on the Immorality and Profaneness of the Stage. However, either the reputation Sir John gained by his comedies, or his skill in architecture, procured him very considerable advantages. He was appointed Clarencieux king at arms, which he afterwards disposed of. In 1716. he was appointed surveyor of the works at Greenwich hospital; he was likewise made comptroller-general of his majesty's works, and surveyor of all the gardens and waters. He was an able architect; but his performances in that way are esteemed heavy. Under his direction were raised Blenheim-house in Oxfordshire, Claremont in Surry, and his own house at Whitehall. He died of a quinsy in 1726.

VANDELLIA, in botany; a genus of plants belonging to the class *didynamia* and order *angiospermia*. The calyx is subquadrid; the corolla ringent; the two exterior filaments proceed from the disc of the lip of the corolla; the antheræ are connected; the capsule is unilocular and polyspermous. There is only one species known, the *diffusa*.

VAN-DIEMEN'S LAND. See DIEMEN.

VANDYCK (Sir Anthony), a celebrated painter, was born at Antwerp in the year 1599. It is said that Vandyck's mother was passionately fond of embroidery, that she excelled in it, and embroidered several historical subjects with such surprising skill, that they have been esteemed masterpieces by proficient in that art. Being desirous to have her son instructed in the first rudiments of grammar, she began by sending him to school to learn reading and writing. As he had ink, paper, and pens, at command, he amused himself more with drawing figures and other slight sketches, than with making letters. One day his master having threatened to whip one of his school-fellows, Vandyck positively assured him, that he need not fear his master's threats, as he would take care to prevent his receiving the threatened correction.—“How so?” replied his school-fellow. “I'll paint (replied Vandyck) a face on your posteriors;” which he did with such skill, that when the master drew up the curtain, he laughed so immoderately that he forgave the culprit. After giving several early proofs of his excellent genius, he became the disciple of the illustrious Rubens. In the church of the Augustines at Antwerp, at the high altar, is a celebrated picture of Rubens, representing, in one part, the Virgin Mary sitting with the child Jesus in her lap, and in another part several saints, male and female, standing. The breast of one of these, St Sebastian, is said to have been painted by Vandyck when he was only a disciple of Rubens. This great master being engaged one day abroad, his disciples went into his painting-room, where, after having been some time employed in admiring his works, they began to play or romp in such a manner, that the breast of St Sebastian, which was not yet dry, was brushed away by a hat thrown at random. This accident put an end to their play: they were very anxious to restore it, fearing that if Rubens discovered it they should all be discarded. At length it was agreed that Anthony should undertake to mend the saint's breast. In

short, taking his master's pallet and brushes, he succeeded so well, that his companions imagined Rubens would overlook it. They were mistaken; for Rubens at his return knew immediately that some one had touched upon his performance: calling his disciples, he asked them why any one had dared to meddle with his painting? They were some time doubtful whether they should confess or deny the fact. Threats at length prevailed: they owned that Vandyck had thrown his hat upon it. Upon this, closeting Vandyck, instead of chiding him, he told him, that “it was proper and even necessary for him to travel into Italy, the only school that produced excellent painters; and that, if he would take his advice, he would arrive at the highest perfection.” Vandyck replied, that “he was very desirous of it; but that his purse was not equal to such a journey, and that he feared he should be obliged to sell his hat on the road.” Rubens assured him that that should be his concern; and accordingly, a few days after, he made him a present of a purse full of pistoles, and added to that gift a dapple grey horse, of great beauty, to carry him thither. In return for this, Vandyck painted his master a chimney-piece; and afterwards set out for Italy, about the year 1621, being then about 21 or 22 years of age. Having staid a short time at Rome, he removed to Venice, where he attained the beautiful colouring of Titian, Paul Veronese, and the Venetian school, which appeared from the many excellent pictures he drew at Genoa.

After having spent a few years abroad, he returned to Flanders, with so noble, so easy, and natural a manner of painting, that Titian himself was hardly his superior; and no other master could equal him in portraits. Soon after his return, he accidentally met with D. Teniers, who accosted him with great politeness, and asked him whether he had much business since he came from Rome? “What business, think you, can I have had time to do (replied Vandyck)? I am only just arrived here. Would you believe, that I offered to draw that fat brewer's picture who just passed by us for two pistoles, and that the looby laughed in my face, saying it was too dear? I assure you, that if the cards do not turn up better, I shall make no long stay at Brussels.” Soon after this, he painted those two famous pictures, the Nativity and a dying Christ; the first in the parish-church, the second in that of the Capuchins, at Termond.

When he was in Holland he was very desirous to see Francis Hals the painter, who had great reputation then for portraits. On entering his room, he asked to have his picture drawn. Hals, who knew Vandyck only by fame, undertook it, and went to work. The latter seeing his head finished, rose up, saying, that it was a striking likeness. Afterwards he proposed to Hals, that if he would sit in return, he would also draw his picture; to which Hals having agreed, merely from curiosity, exclaimed, on seeing his picture so soon finished, “Thou art the devil, or else Vandyck.” This picture of Hals has been engraved by Coster at the Hague.

Vandyck, finding he could not make a fortune in his own country, took a resolution of going over into England. Accordingly he borrowed some guineas of Teniers, and set out, furnished with letters of recommendation. His superior genius soon brought him into great reputation; and above all, he excelled in portraits, which he drew with an inconceivable facility, and for which he charged a very high price, according to the instructions which had been given him on that head. It is affirmed, that for some of them he received 400 guineas apiece. He soon found himself loaded with honours and riches; and as he had a noble and generous heart, he made a figure suitable to his fortune. He married one of the fairest ladies of the English court, a daughter of the lord Ruthven,

Vane
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Vapours.

Ruthven, earl of Gowry; and, though she had but little fortune, maintained her with a grandeur answerable to her birth. He himself was generally richly dressed; his coaches and equipage were magnificent, and his retinue was numerous; his table was elegant, and plentifully furnished; and he often entertained his guests after dinner with a concert performed by the best English musicians of London. In short, his house was so frequented by persons of the greatest quality of both sexes, that his apartments rather resembled the court of a prince than the lodgings of a painter. Notwithstanding this expence, he amassed great wealth; when a chemist had the art to insinuate himself into his esteem, and inspired him with a desire of converting copper into gold: but the secret had no other effect, than making him convert his gold into smoke. Rubens being informed of it, wrote to his disciple: he acknowledged his error, and corrected it. At length Vandyck being at an early age subject to the gout, it undermined him by degrees, and carried him to the grave in the year 1641, at the age of 42. He was buried in St Paul's; and left to his heirs a considerable estate, which some have made to amount to 40,000l. sterling.

VANE, a thin slip of bunting hung to the mast-head, or some other conspicuous place in the ship, to show the direction of the wind. It is commonly sewed upon a wooden frame called the *stock*, which contains two holes whereby to slip over the spindle, upon which it turns about as the wind changes.

VANILLA, or VANILLO. See EPIDENDRUM.

VAPOUR, in philosophy, the particles of bodies rarefied by heat, and thus rendered specifically lighter than the atmosphere, in which they rise to a considerable height. See EVAPORATION, DAMP, GAS, &c.

Many kinds of vapour are unfriendly to animal life, but the most noxious are those which arise from metallic substances. In the smelting and refining of lead, a white vapour arises, which, falling upon the grass in the neighbourhood, imparts a poisonous quality to it, so that the cattle which feed there will die; and in like manner stagnant waters impregnated with this vapour will kill fish. In some places the earth exhales vapours of a very noxious quality; such as the Grotto del Cani, and other places in Italy, where a mephitic vapour constantly hovers over the surface of the ground, proving instantly fatal to such animals as are immersed in it. In some parts of the world there have been instances of people killed, and almost torn to pieces, by a vapour suddenly bursting out of the earth under their feet.

Of the aqueous vapour raised from the earth by the sun's heat are formed the clouds; but though these are commonly at no great distance from the earth, we cannot from thence determine the height to which the vapours ascend. Indeed, considering the great propensity of water, and even quicksilver, to evaporate in the most perfect vacuum we can make, it is by no means probable that any limit can be fixed for this ascent. See WEATHER.

VAPOURS, noxious, method of dissipating. The following ingenious method of dissipating the noxious vapours commonly found in wells and other subterraneous places, is related in the *Trans. Philad.* by Mr Robinson of Philadelphia the inventor. "After various unsuccessful trials (says he), I was led to consider how I could convey a large quantity of fresh air from the top to the bottom of the well, supposing that the foul would necessarily give way to the pure air. With this view I procured a pair of smith's bellows, fixed in a wooden frame, so as to work in the same manner as at the forge. This apparatus being placed at the edge of the well, one end of a leather tube (the hose of a fire-engine) was closely adapted to the nose of the bellows, and the other

end was thrown into the well, reaching within one foot of the bottom. At this time the well was so infected, that a candle would not burn at a short distance from the top; but, after blowing with my bellows only half an hour, the candle burned bright at the bottom; then, without farther difficulty, I proceeded in the work, and finished my well. Wells are often made in a very slight manner, owing to the difficulty of working in them, and there have been several fatal instances of the danger attending the workmen; but, by the above method, there is neither difficulty nor danger in completing the work with the utmost solidity. It is obvious, that in cleansing vaults, and working in any other subterraneous place, subject to damp as they are called, the same method must be attended with the same beneficial effect."

VAPOURS, in medicine, a disease properly called *hyps*, or the *hypochondriacal disease*; and in men particularly, the *spleen*. See MEDICINE, n° 276 and 321.

VAPOUR-BATH, in chemistry, a term applied to a chemist's bath or heat, wherein a body is placed so as to receive the fumes of boiling water. It consists of two vessels, disposed over one another in such manner as that the vapour raised from the water contained in the lower heats the matter inclosed in the upper. It is very commodious for the distilling of odiferous waters, and the drawing of spirit of wine.

We also use the term *vapour-bath*, when a sick person is made to receive the vapours arising from some liquid matter placed over a fire. Many contrivances have been proposed for this purpose; and their expediency and utility are best known to those who are conversant in this business. A late writer has suggested a new construction of vapour baths; and the whole apparatus is reduced to a tin-boiler, tin pipes wrapped in flannel, and a deal box with a cotton cover, for the reception of the body and circulation of the vapour.

VARL, in medicine, little, hard, and ruddy tumors, which frequently infest the faces of young persons of a hot temperament of body.

VARIATION of the Compass, is the deviation of the magnetic or mariner's needle from the meridian or true north and south line. On the continent it is called the *declination* of the magnetic needle; and this is a better term, for reasons which will appear by and by.

Our readers know, that the needle of a mariner's compass is a small magnet, exactly poised on its middle, and turning freely in a horizontal direction on a sharp point, so that it always arranges itself in the plane of the magnetic action. We need not add any thing on this head to what has been delivered in the articles COMPASS and Azimuth COMPASS.

About the time that the polarity of the magnet was first observed in Europe, whether originally, or as imported from China, the magnetic direction, both in Europe and in China, was nearly in the plane of the meridian. It was therefore an inestimable present to the mariner, giving him a sure direction in his course through the pathless ocean. But by the time that the European navigators had engaged in their adventurous voyages to far distant shores, the deviation of the compass needle from the meridian was very sensible even in Europe; and it is somewhat surprising that the Dutch and Portuguese navigators did not observe it on their own coasts. The son of Columbus positively says, that it was observed by his father in his first voyage to America, and made his companions so anxious lest they should not find the way back again to their own country, that they mutinied and refused to proceed. It is surprising that any should doubt of its being known to this celebrated navigator, because he even endeavours to account for it by supposing the needle always to point to a fixed point of the heavens, different from the pole of the world, which he calls

Vapours
||
Variation.

Variation. the point attractive. It is at any rate certain that Gonzales Oviedo and Sebastian Cabot observed it in their voyages. Indeed it could not possibly escape them; for in some parts of their several tracks the needle deviated above 25 degrees from the meridian; and the rudest dead reckoning, made on the supposition of the needle pointing due north and south, must have thrown the navigators into the utmost confusion. It would indeed be very difficult for them, unprepared for this source of error, to make any tolerable guess at its quantity, till they got to some place on shore, where they could draw a meridian line. But we know that spherical trigonometry was at that time abundantly familiar to the mathematicians of Europe, and that no person pretended to take the command of a ship bound to a distant port that was not much more informed in this science than most masters of ships are now-a-days. It could not be long, therefore, before the methods were given them for discovering the variation of the compass by observation of AMPLITUDES and AZIMUTHS, as is practised at present (see each of these articles). But the deviation of the compass from the meridian was not generally allowed by mathematicians, who had not yet become sensible of the necessity of quitting the Aristotelean trammels, and investigating nature by experiments. They rather chose to charge the navigators with inaccuracy in their observations than the schoolmen with error in principles. Pedro de Medina at Valladolid, in his *Arte de Navegar*, published in 1545, positively denies the variation of the compass. But the concurring reports of the commanders of ships on distant voyages, in a few years, obliged the landmen in their closets to give up the point; and Martin Cortez, in a treatise of navigation, printed at Seville before 1556, treats it as a thing completely established, and gives rules and instruments for discovering its quantity. About the year 1580 Norman published his discovery of the *dip* of the needle, and speaks largely of the horizontal deviation from the plane of the meridian, and attributes it to the attraction of a point, not in the heavens, but in the earth, and describes methods by which he hoped to find its place. To the third, and all the subsequent editions of Norman's book (called the *new attractive*), was subjoined a dissertation by Mr Burroughs, comptroller of the navy, on the variation of the compass, in which are recorded the quantity of this deviation in many places; and he laments the obstacle which it causes to navigation by its total uncertainty previous to observation. The author indeed offers a sort of rule for computing it *a priori*, founded on some conjecture as to its cause; but, with the modesty and candour of a gentleman, acknowledges that this is but a guess, and intreats all navigators to be assiduous in their observations, and liberal in communicating them to the public; conjuring them to consider, that an interested regard to their own private advantage, by concealing their knowledge, may prove the shipwreck of thousands of brave men. Accordingly observations were liberally contributed from time to time, and were published in the subsequent treatises on navigation.

But in 1635 the mariners were thrown into a new and great perplexity, by the publication of a *Discourse mathematical on the variation of the Magnetical Needle*, by Mr Henry Gillebrand, Gresham professor of astronomy. He had compared the variations observed at London by Burroughs, Gunter, and himself, and found that the north end of the mariner's needle was gradually drawing more to the westward. For Norman and Burroughs had observed it to point about $11\frac{1}{2}$ degrees to the east of the north in 1580; Gunter found its deviation only $6\frac{1}{4}$ in 1622, and he himself had observed only 4° in 1634; and it has been found to deviate more

and more to the westward ever since, as may be seen from Variation the following little table in Waddington's Navigation.

London.

1576 Norman	$11^\circ 15'$ East.
1580 Burroughs	11.17
1622 Gunter	6.12
1634 Gillebrand	4.5
1662	0.0
1666 Sellers	0.34 West
1670	2.06
1672	2.30
1700	9.40
1720	$13.—$
1740	16.10
1760	19.30
1774	22.20
1778 Phil. Transf.	22.11

Mr Bond, teacher of mathematics in London, and employed to take care of and improve the impressions of the popular treatises of navigation, about the 1650, declared, in a work called the "Seaman's Kalendar," that he had discovered the true progress of the deviation of the compass; and published in another work, called the "Longitude Found," a table of the variation for 50 years. This was, however, a very gratuitous sort of prognostication, not founded on any well-grounded principles; and though it tallied very well with the observations made in London, which showed a gradual motion to the westward at the rate of $—12'$ annually, by no means agreed with the observations made in other places. See Phil. Transf. 1668.

But this glad news to navigators soon lost its credit: for the inconsistency with observation appeared more and more every day, and all were anxious to discover some general rule, by which a near guess at least might be made as to the direction of the needle in the most frequented seas. Mr Halley, one of the first geometers and most zealous philosophers of the last century, recommended the matter in the most earnest manner to the attention of government; and, after much unwearied solicitation, obtained a ship to be sent on a voyage of discovery for this very purpose. He got the command of this ship, in which he repeatedly traversed the Atlantic Ocean, and went as far as the 50th degree of southern latitude. See his very curious speculations on this subject in the Phil. Transf. 1683 and 1692.

After he had collected a prodigious number of observations made by others, and compared them with his own, he published in 1700 a synoptical account of them in a very ingenious form of a sea-chart, where the ocean was crossed by a number of lines passing through those places where the compass had the same deviation. Thus, in every point of one line there was no variation in 1700; in every point of another line the compass had 20 degrees of east variation; and in every point of a third line it had 20° of west variation. These lines have since been called *Halleyan lines*, or curves. This chart was received with universal applause, and was undoubtedly one of the most valuable presents that science has made to the arts. But though recommended with all the earnestness which its importance merited, it was offered with the candour and the caution that characterises a real philosopher ardently zealous for the propagation of true knowledge. Its illustrious author reminds the public of the inaccuracy of observations collected from every quarter, many of them made by persons not sufficiently instructed, nor provided with proper instruments; many also without dates, and most of them differing in their dates, so that some reduction was necessary for all, in order to bring them to a common epoch; and this must be made without having

VARIATION.

Plate DXIII.

Fig. 1.

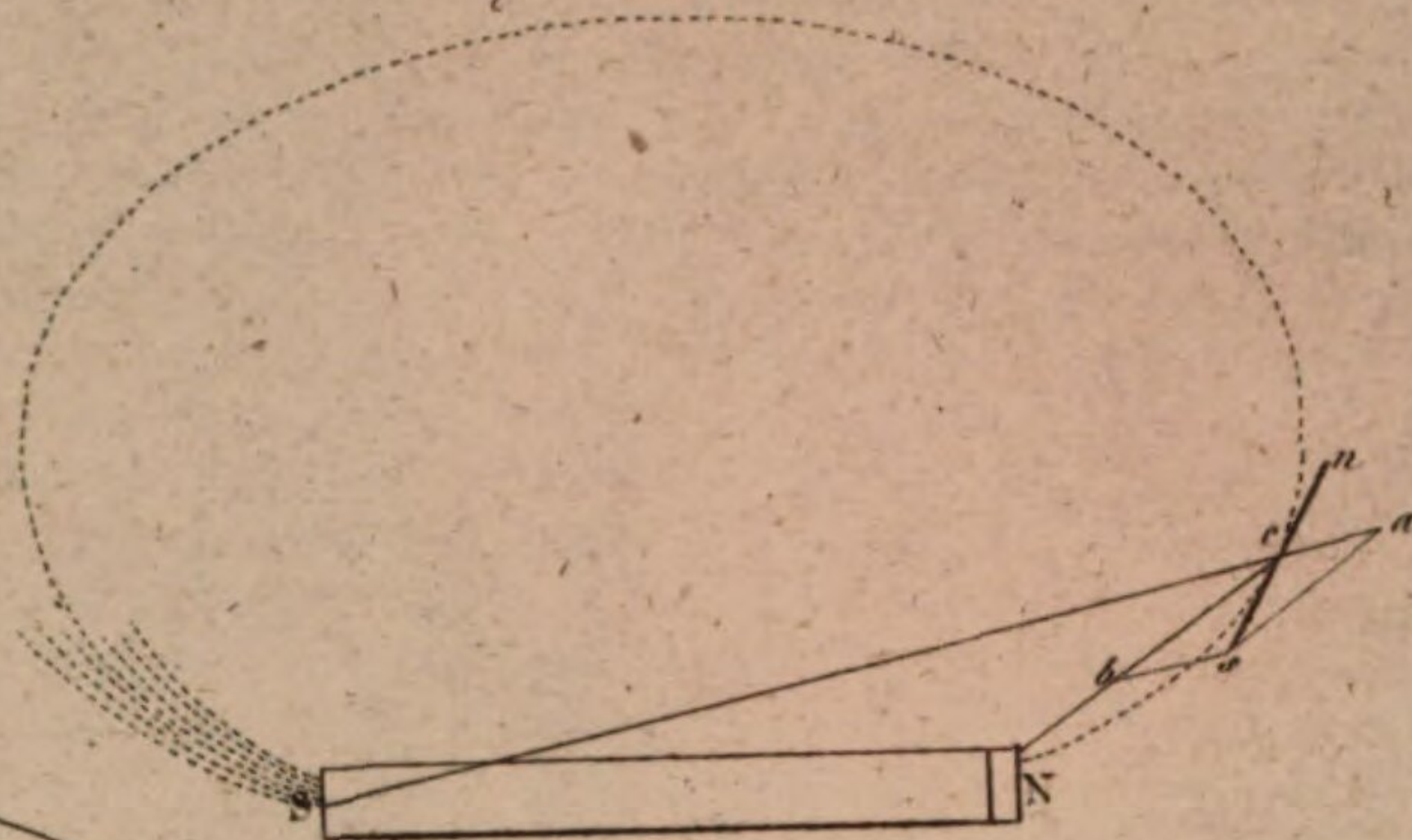


Fig. 3.

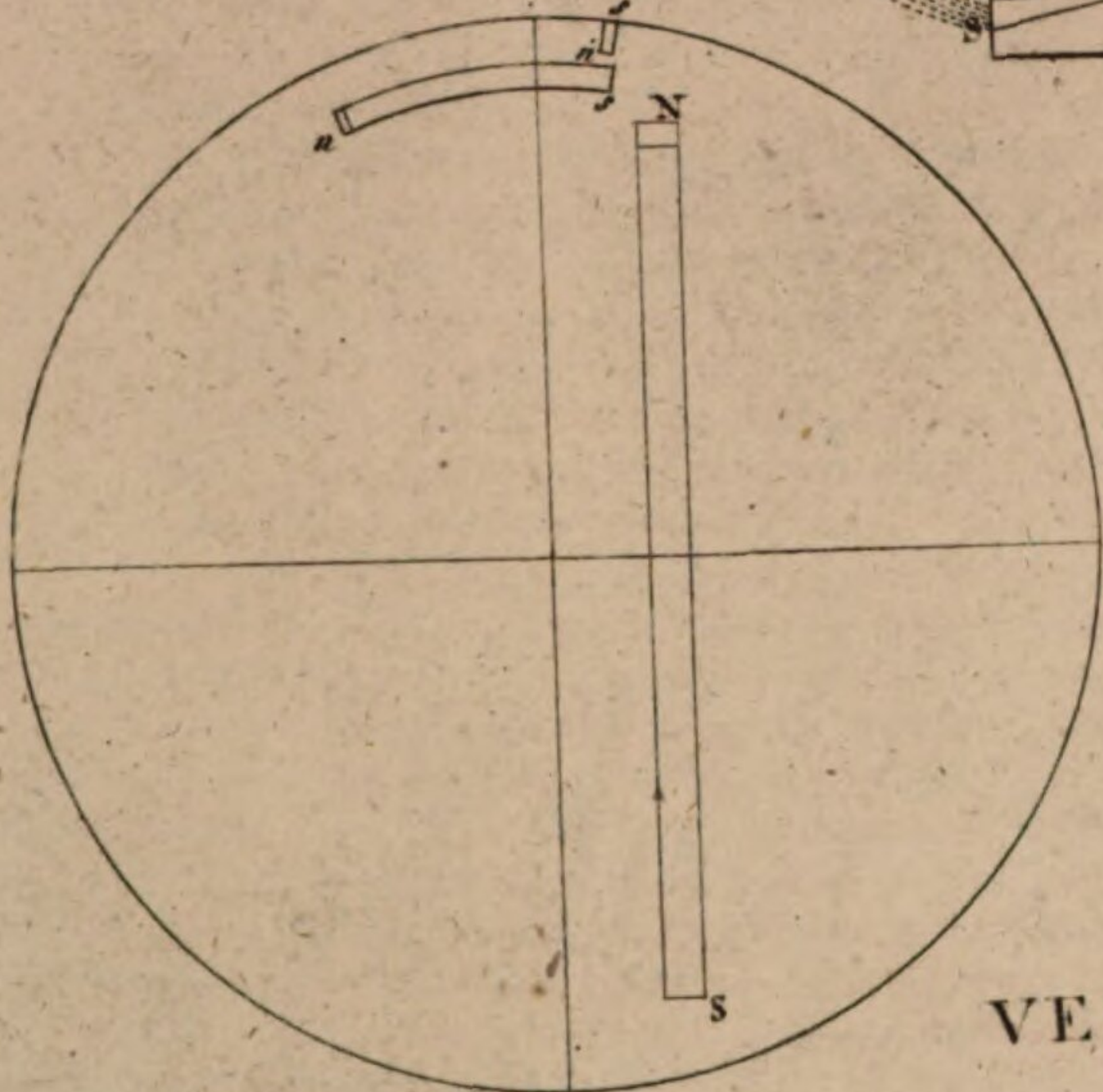
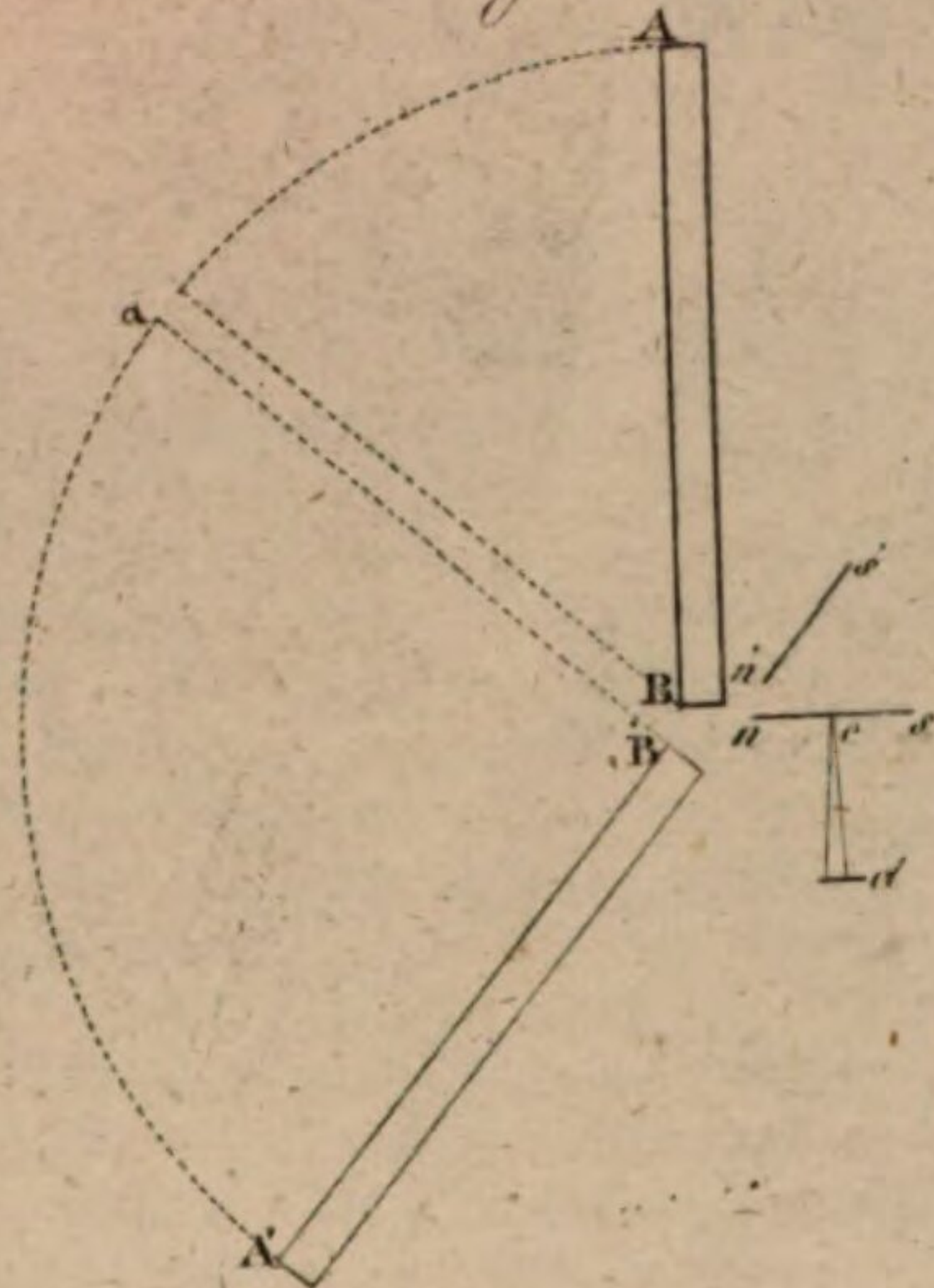


Fig. 2.



VENTILATOR.

Fig. 2.

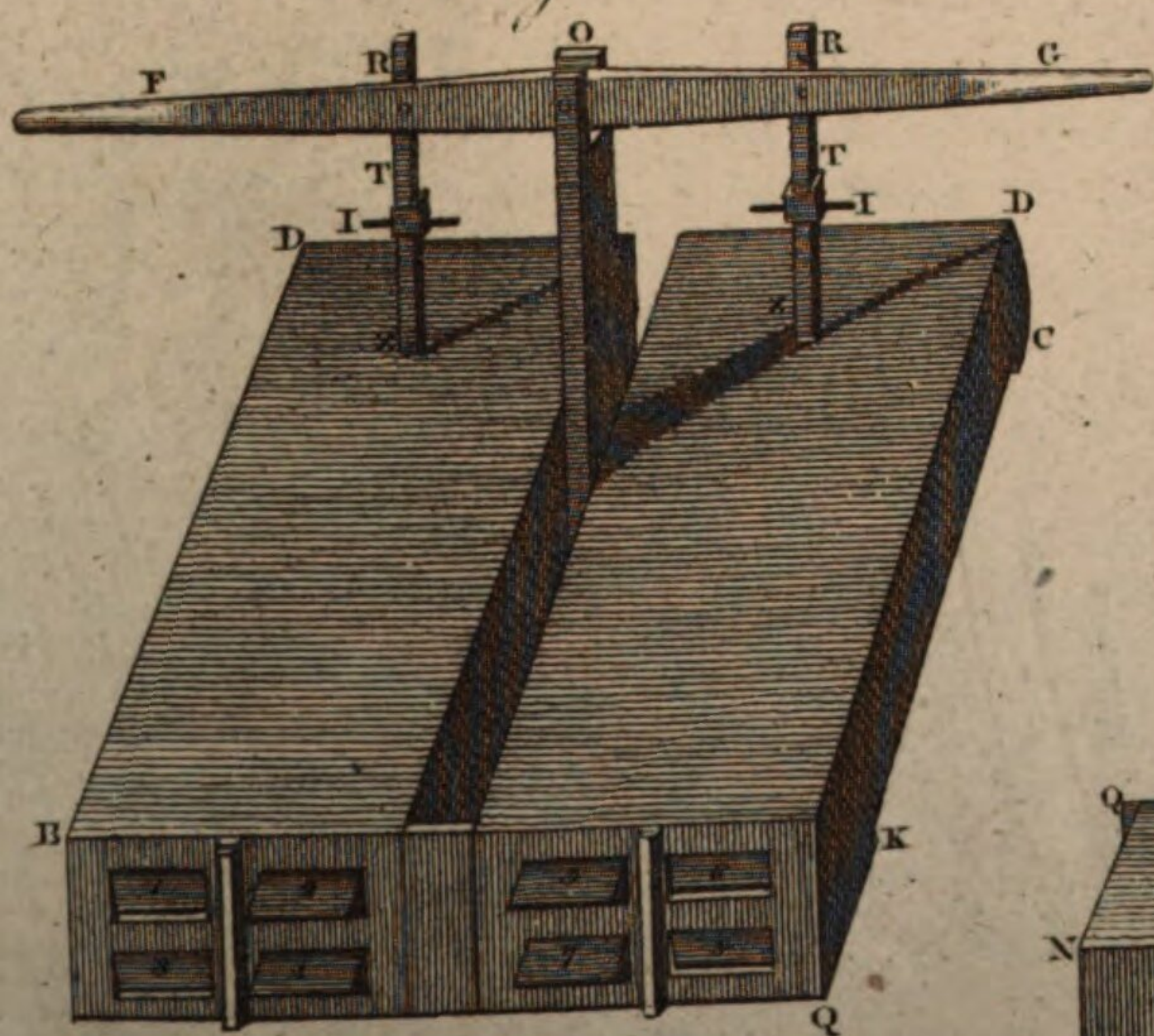


Fig. 1.

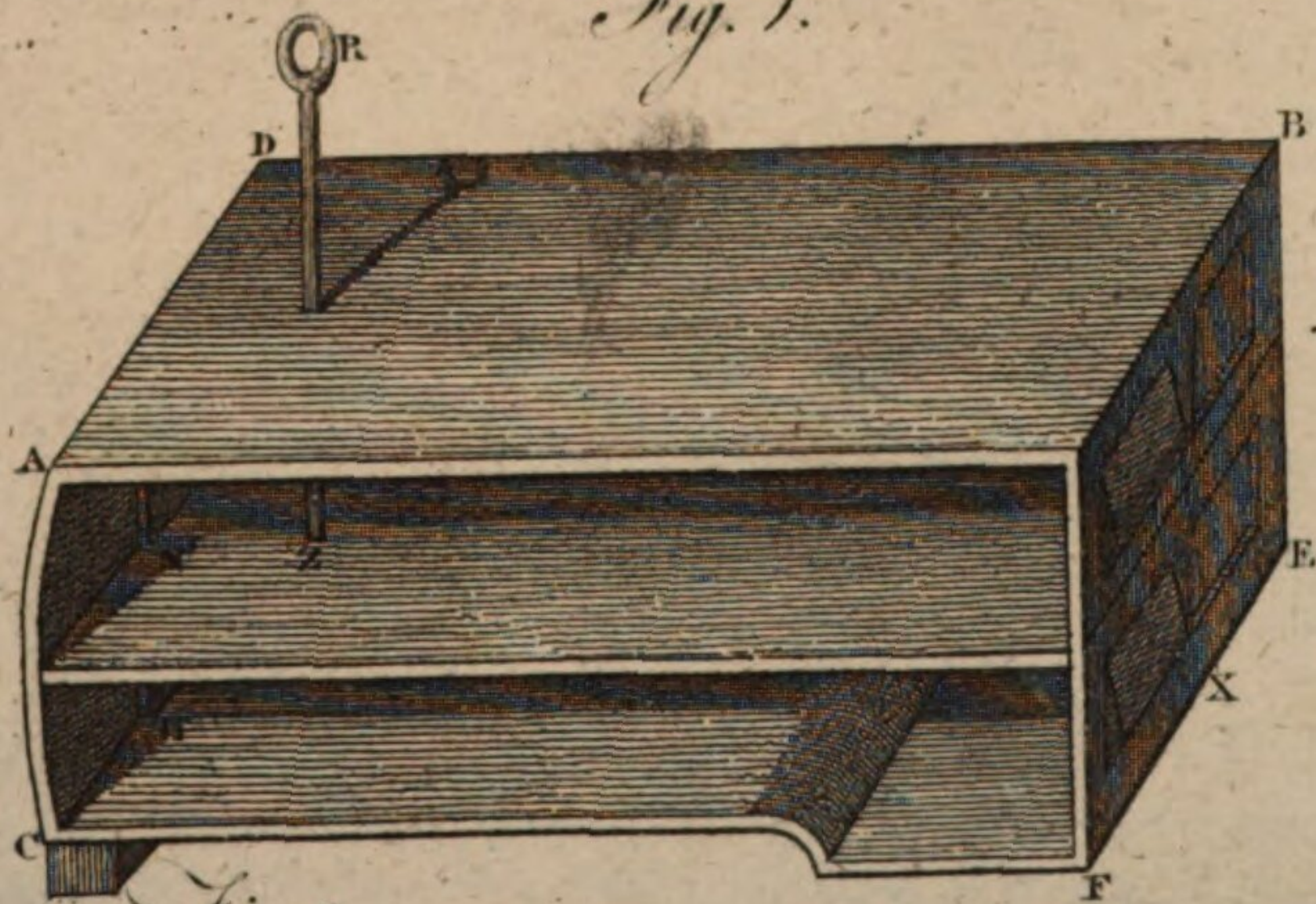
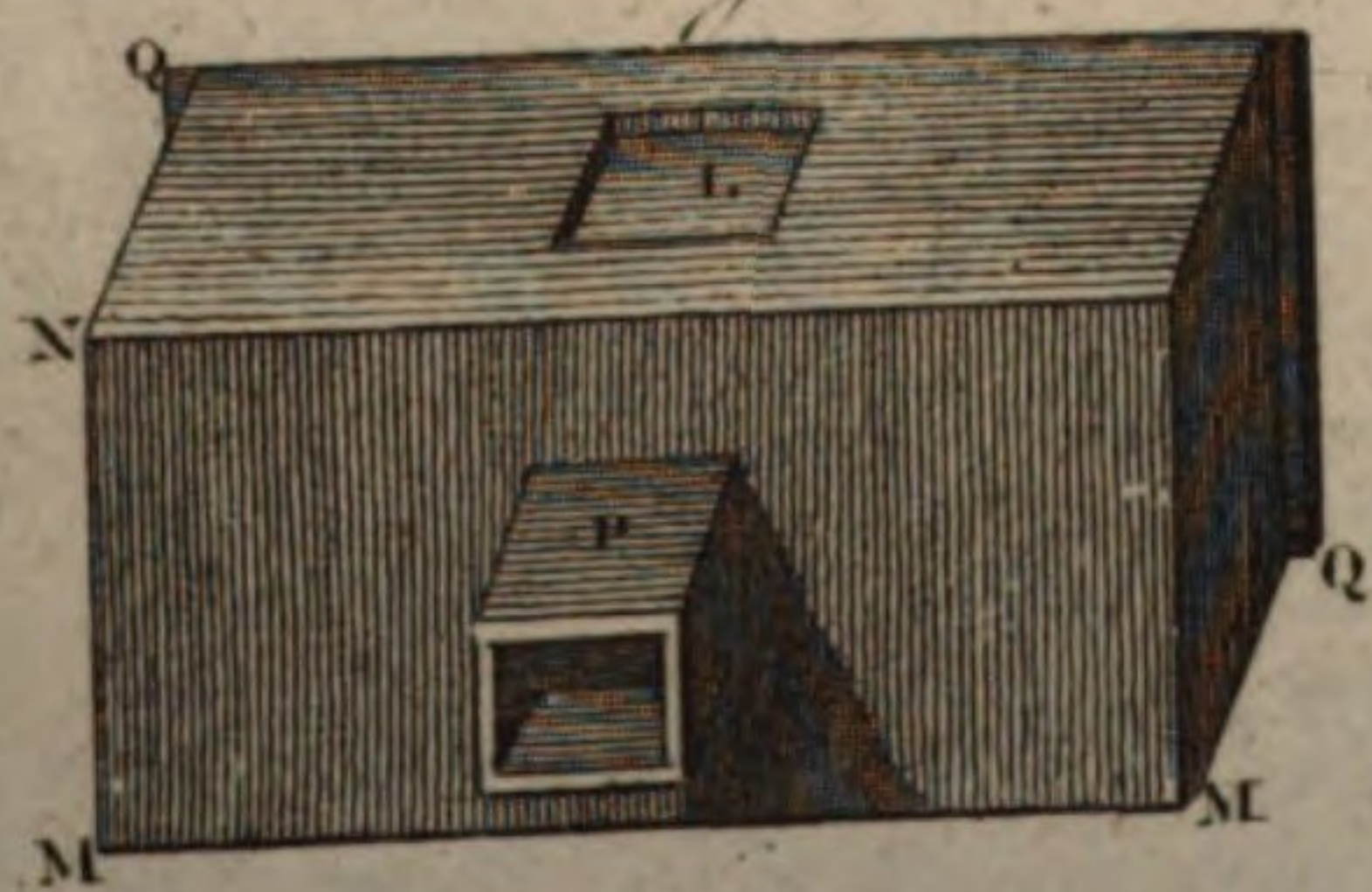


Fig. 3.



Variation. having an unquestionable principle on which to proceed. He said, that he plainly saw that the change of variation was very different in different places, and in the same place at different times; and confesses that he had not discovered any general principle by which these changes could be connected.

Halley's *Variation Chart*, however, was of immense use; but it became gradually less valuable, and in 1745 was exceedingly erroneous. This made Messrs Mountain and Dodson, fellows of the Royal Society, apply to the admiralty and to the great trading companies for permission to inspect their records, and to extract from them the observations of the variations made by their officers. They got all the assistance they could demand; and, after having compared above 50,000 observations, they composed new variation charts, fitted for 1745 and 1756.

The polarity of the magnetic needle, and a general tho' intricate connection between its positions in all parts of the world, naturally causes the philosopher to speculate about its cause. We see that Cortez ascribed it to the attraction of an eccentric point, and that Bond thought that this point was placed not in the heavens, but in the earth. This notion made the basis of the famous Theory of Magnetism of Dr Gilbert of Colchester, the first specimen of experimental philosophy which has been given to the public. It was published about the year 1600: he was an intimate acquaintance of the great experimental philosopher lord Bacon, and proceeded entirely according to the plan laid down by that illustrious leader in his *Novum Organum Scientiarum*.

Gilbert asserted that the earth was a great magnet, and that all the phenomena of the mariner's compass were the effects of this magnetism. He showed at least that these phenomena were precisely such as would result from such a constitution of the earth; that is, that the positions of the mariner's needle in different parts of the earth were precisely the same with those of a small magnet similarly situated with respect to a very large one. Although he had made more magnetic experiments than all that had gone before him put together, still the magnetical phenomena were but scantily known till long after. But Gilbert's theory (for so it must be truly esteemed) of the magnetical phenomena is now completely confirmed. The whole of it may be understood from the following general proposition.

Let NS (fig. 1.) be a magnet, of which N is the north and S the south pole: Let ns be any oblong piece of iron, poised on a point c like a compass needle. It will arrange itself in a position ncs precisely the same with that which would be assumed by a compass needle of the same size and shape, having n for its north and s its south pole. And while the piece of iron remains in this position, it will be in all respects a magnet similar to the real compass needle. The pole n will attract the south pole of a small magnetised needle, and repel its north pole. If a paper be held over ns , and fine iron-filings be strewed on it, they will arrange themselves into curves issuing from one of its ends and terminating at the other, in the same manner as they will do when strewed on a paper held over a real compass needle. But this magnetism is quite temporary; for if the piece of iron ns be turned the other way, placing n where s now is, it will remain there, and will exhibit the same phenomena. We may here add, that if ns be almost infinitely small in comparison of NS, the line ns will be in such a position that if sa, sb , be drawn parallel to Nc, Sc , we shall have sa to sb as the force of the pole N to the force of the pole S. And this is the true cause of that curious disposition of iron-filings when strewed round a magnet. Each fragment becomes a momentary magnet, and arranges itself in the true magnetic direction; and when so arranged, attracts the two adjoining fragments, and co-

operates with the forces, which also arrange them. We throw this out to the ingenious mechanician as the foundation of a complete theory of the magnetical phenomena. When the filings are infinitely fine, the curves NcS have this property, that, drawing the tangent ncs , we always have $sa:sb = \text{force of N} : \text{force of S}$; and thus we may approximate at pleasure to the law of magnetic attraction and repulsion. The public may expect to have soon a theory of magnetism founded on this principle, and applied with the completest success to every phenomenon yet observed.

Now, to apply this theory to the point in hand.—Let ns (fig. 2.) be a small compass needle, of which n is the north and s the south pole: let this needle be poised horizontally on the pin cd ; and let $n's'$ be the position of the dipping needle. Take any long bar of common iron, and hold it upright, or nearly so, as represented by AB. The lower end B will repel the pole n and will attract the pole s , thus exhibiting the properties of a north pole of the bar AB. Keeping B in its place, turn the bar round B' as a centre, till it come into the position A'B' nearly parallel to $n's'$. You will observe the compass needle ns attract the end B' with either pole n or s , when B'A' is in the position B' perpendicular to the direction $n's'$ of the dipping needle: and when the bar has come into the position B'A', the upper end B' will show itself to be a south pole by attracting n and repelling s . This beautiful experiment was exhibited to the Royal Society in 1673 by Mr Hindshaw.

From this it appears, that the great magnet in the earth induces a momentary magnetism on soft iron precisely as a common magnet would do. Therefore (says Dr Gilbert) it induces permanent magnetism on magnetisable ores of iron, such as loadstones, in the same manner as a great loadstone would do; and it affects the magnetism already imparted to a piece of tempered steel precisely as any other great magnet would.

Therefore the needle of the mariner's compass in every part of the world arranges itself in the magnetic direction, so that, if poised as a dipping needle should be, it will be a tangent to one of the curves NcS of fig. 1. The horizontal needle being so poised as to be capable of playing only in a horizontal plane, will only arrange itself in the plane of the triangle NcS . That end of it which has the same magnetism with the south pole S of the great magnet included in the earth will be turned towards its north pole N. Therefore what we call the north pole of a needle or magnet really has the magnetism of the south pole of the great primitive magnet. If the line NS be called the axis, and N and S the poles of this great magnet, the plane of any one of these curves NcS will cut the earth's surface in the circumference of a circle, great or small according as the plane does or does not pass through the centre of the earth.

Dr Halley's first thought was, that the north pole of the great magnet or loadstone which was included in the bowels of the earth was not far from Baffin's Bay, and its south pole in the Indian ocean south-west from New Zealand. But he could not find any positions of these two poles which would give the needle that particular position which it was observed to assume in different parts of the world; and he concluded that the great terrestrial loadstone had four irregular poles (a thing not unfrequent in natural loadstones, and easily producible at pleasure), two of which are stronger and two weaker. When the compass is at a great distance from the two north poles, it is affected so as to be directed nearly in a plane passing through the strongest. But if we approach it much more to the weakest, the greater vicinity will compensate for the smaller absolute force of the weak pole, and occasion considerable irregularities. The appearances are favourable to this opinion. If this be the real

Variation. constitution of the great magnet, it is almost a desperate task to ascertain by computation what will be the position of the needle. Halley seems to have despaired; for he was both an elegant and a most expert mathematician, and it would have cost him little trouble to ascertain the places of two poles only, and the direction which these would have given to the needle. But to say what would be its position when acted on by four poles, it was necessary to know the law by which the magnetic action varied by a variation of distance; and even when this is known, the computation would have been exceedingly difficult.

In order to account for the change of variation, Dr Halley supposes this internal magnet not to adhere to the external shell which we inhabit, but to form a nucleus or kernel detached from it on all sides, and to be so poised as to revolve freely round an axis, of which he hoped to discover the position by observation of the compass. The philosopher will find nothing in this ingenious hypothesis inconsistent with our knowledge of nature. Dr Halley imagined that the nucleus revolved from east to west round the same axis with the earth. Thus the poles of the magnet would change their positions relatively to the earth's surface, and this would change the direction of the compass needle.

The great Euler, whose delight it was always to engage in the most difficult mathematical researches and computations, undertook to ascertain the position of the needle in every part of the earth. His dissertation on this subject is to be seen in the 13th volume of the *Memoirs of the Royal Academy of Berlin*, and is exceedingly beautiful, abounding in those analytical *tours d'adresse* in which he surpassed all the world. He has reduced the computation to a wonderful simplicity.

He found, however, that four poles would engage him in an analysis which would be excessively intricate, and has contented himself with computing for two only; observing that this supposition agrees so well with observation, that it is highly probable that this is the real constitution of the terrestrial magnet, and that the coincidence would have been perfect if he had hit on the due positions of the two poles. He places one of them in lat. 76° north, and long. 96° west from Teneriffe. The south pole is placed in lat. 58° south, and long. 158° west from Teneriffe. These are their situations for 1757.—Mr Euler has annexed to his dissertation a chart of Halleyan curves suited to these assumptions, and fitted to the year 1757.

It must be acknowledged, that the general course of the variations according to this theory greatly resembles the real state of things; and we cannot but own ourselves highly indebted to this great mathematician for having made so fine a first attempt. He has improved it very considerably in another dissertation in the 22d volume of these memoirs. But there are still such great differences, that the theory is of no service to the navigator, and it only serves as an excellent model for a farther prosecution of the subject. Since that time another large variation chart has been published, fitted to a late period; but the public has not sufficient information of the authorities or observations on which it is founded.

The great object in all these charts is to facilitate the discovery of a ship's longitude at sea. For the lines of variation being drawn on the chart, and the variation and the latitude being observed at sea, we have only to look on the chart for the intersection of the parallel of observed latitude and the Halleyan curve of observed variation. This intersection must be the place of the ship. This being the purpose, the Halleyan lines are of great service; but they do not give us a ready conception of the direction of the needle. We have always to imagine a line drawn through the point,

cutting the meridian in the angle corresponding to the Halleyan line. We should learn the general magnetic affections of the globe much better if a number of magnetic meridians were drawn. These are the intersections of the earth's surface with planes passing through the magnetical axis, cutting one another in angles of 5° or 10° . This would both show us the places of the magnetic poles much more clearly, and would, in every place, show us at once the direction of the needle. In all those places where these magnetical curves touch the meridians, there is no variation; and the variation in every other place is the angle contained between these magnetical meridians and the true ones.

The program of a work of this kind has been published by a Mr Churchman, who appears to have engaged in the investigation with great zeal and considerable opportunities. He had been employed in some operations connected with surveys of the back settlements in North America. It is pretty certain that the north magnetic pole (or point, as Mr Churchman chooses to call it) is not far removed from the stations given it by Halley and Euler; and there seems no doubt but that in the countries between Hudson's Bay and the western coasts of North America the needle will have every position with respect to the terrestrial meridian, so that the north end of a compass-needle will even point due south in several places. Mr Churchman has solicited assistance from all quarters, to enable him to traverse the whole of that inhospitable country with the compass in his hand. It were greatly to be wished that our gracious sovereign, who has always shown such a love for the promotion of nautical science, and who has so munificently contributed to it, already enriching the world with the most valuable discoveries, and thus laying posterity under unspeakable obligations; it were greatly to be wished that he would put this almost finishing stroke to the noble work, and enable Mr Churchman, or some fitter person, if such can be found, to prosecute this most interesting inquiry. Almost every thing that can be desired would be obtained by a few well-chosen observations made in those regions. It would be of immense advantage to have the dips ascertained with great precision. These would enable us to judge at what depth under the surface the pole is situated; for the well informed mechanician, who will study seriously what we have said about the magnetical curves, will see that a compass needle, when compared with the great terrestrial magnet, is but as a particle of iron-filings compared to a very large artificial magnet. Therefore, from the position of the dipping needle, we may infer the place of the pole, if the law of magnetic action be given; and this law may be found by means of other experiments which we could point out.

Mr Churchman has adopted the opinion of only two poles. According to him, the north pole lies (in 1800) in Lat. 58° N. and Long. 134° west from Greenwich, very near Cape Fair-weather; and the south pole lies in Lat. 58° S. and Lon. 165° E. from Greenwich. He also imagines that the north pole has moved to the eastward, on a parallel of latitude, about 65° since the beginning of last century (from 1600), and concludes that it makes a revolution in 1096 years. The southern pole has moved less, and completes its revolution in 2289 years. This motion he ascribes to some influences which he calls *magnetic tides*, and which he seems to consider as celestial. This he infers from the changes of variation. He announces a physical theory on this subject, which, he says, enables him to compute the variation with precision for any time past or to come; and he even gives the process of trigonometrical computation illustrated by examples. But as this publication (entitled *The Magnetic Atlas*, published for the Author, by Darton and Harvey, 1794) is only a program, he expresses himself obscurely,

Variation. feurely, and somewhat enigmatically, respecting his theory, waiting for encouragement to make the observations which are necessary for completing it. He has, in the mean time, accompanied his account of the theory with a chart, in the form of gulleys, for covering a globe of 15 inches diameter, objecting very justly to the great distortion which Wright's charts occasion in every part near the poles. This distortion is such as totally to change the appearance of the curves in those very places where their appearance and magnitude are of the greatest moment.

Mr Churchman has also accompanied his work with the returns which he has received from several persons eminent for their rank or learning, to whom he had applied for encouragement and assistance. They are polite, but, we think, not so encouraging as such zeal in such a cause had good reason to expect. We acknowledge that there are circumstances which justify caution in promises of this nature. His proofs are very great, and not qualified with any doubt. Some of his proofs are not very convincing, and there are some considerable defects in the scientific part. He speaks in such terms of the magnetic influences as plainly lead us to conclude that they resemble, in effect at least, the ordinary actions of magnets. He speaks of the influence of one pole being greater than that of the other; and says, that in this case the magnetic equator, where the needle will be parallel to the axis, will not be in the middle between the poles. This is true of a common magnet. He must therefore abide by this supposition in its other consequences. The magnetic meridians must be planes passing through this axis, and therefore must be circles on the surface of the earth. This is incompatible with the observations; nay, his charts are so in many places, particularly in the Pacific Ocean, where the variations by his chart are three times greater than what has been observed.—His parallels of dip are still more different from observation, and are incompatible with any phenomena that could be produced by a magnet having but two poles. His rules of computation are exceedingly exceptionable. He has in fact but one example, and that so particular, that the mode of computation will not apply to any other. This circumstance is not taken notice of in the enunciation of his first problem; and the reader is made to imagine that he has got a rule for computing the variation, whereas all the rules of calculation are only running in a circle. The variation computed for the port of St Peter and Paul in Kamtschatka, by the rule, is ten times greater than the truth. This is like the artifice of a book-maker. We do not meet with any addition to our knowledge on the subject. The author seems to know something of Euler's merit; but instead of prosecuting the subject in his way, he gives us an uninteresting account of the surmises of a number of obscure writers about the difficulty of the task; and we think that Mr Churchman has left us as much in the dark as ever. The observation of the connection of the polarity of the needle with the aurora borealis occurred to the writer of this article as early as 1759, when a midshipman on board the Royal William in the River St Laurence. Some of the gentlemen of the quarter-deck are still alive, and may remember this circumstance being pointed out to them one evening, when at anchor off the Isle aux Coudres, during a very brilliant aurora borealis. The point of the heavens to which all the rays of light converged was precisely that which was opposite to the south end of the dipping-needle. The observation was inserted in the St James's Chronicle, and afterwards (about 1776) in the London Chronicle, with a request to navigators to take notice of it, and communicate their observations.

For our own part, we have little hopes of this problem

Variation. ever being subjected to accurate calculation. We believe, indeed, that there is a cosmical change going on in the earth, which will produce a progressive change in the variation of the needle; and we see none more likely than Dr Halley's notion. There is nothing repugnant to our knowledge of the universe on the supposition of a magnetic nucleus revolving within this earth; and it is very easy to conceive a very simple motion of revolution, which shall produce the very motion of the sensible poles which Mr Churchman contends for. We need only suppose that the magnetical axis of this nucleus is not its axis of revolution. It may not even bisect that axis; and this circumstance will cause the two poles to have different degrees of motion in relation to the shell which surrounds it.

But this regular progress of the magnet within the earth may produce very irregular motions of the compass needle, by the intervention of a third body susceptible of magnetism. The theory of which we have just given a hint comes here to our assistance. Suppose NS (fig. 3.) to represent the primitive magnet in the earth, and ns to be a stratum of iron-ore susceptible of magnetism. Also let $n's'$ be another small mass of a similar ore; and let their situations and magnitudes be such as is exhibited in the figure. The fact will be, that n will be the north pole and s the south pole of the great stratum, and n' and s' will be the north and south poles of the small mass or loadstone. Any person may remove all doubts as to this, by making the experiment with a magnet NS, a piece of iron or soft tempered steel ns , and another piece $n's'$. The well informed and attentive reader will easily see, that by such interventions every conceivable anomaly may be produced. While the great magnet makes a revolution in any direction, the needle will change its position gradually, and with a certain regularity; but it will depend entirely on the size, shape, and situation, of these intervening masses of magnetisable iron-ore, whether the change of variation of the compass shall be such as the primitive magnet alone would have produced, or whether it shall be of a kind wholly different.

Now, that such intervening disturbances may exist, is past contradiction. We know that even on the film of earth which we inhabit, and with which only we are acquainted, there are extensive strata or otherwise disposed masses of iron-ores in a state susceptible of magnetism; and experiments made on bars of hard tempered steel, and on bits of such ores, assure us that the magnetism is not induced on such bodies in a moment, but propagated gradually along the mass.—That such disturbances do actually exist, we have many relations. There are many instances on record of very extensive magnetic rocks, which affect the needle to very considerable distances. The island of Elbe in the Mediterranean is a very remarkable instance of this. The Island of Cannay also, on the west of Scotland, has rocks which affect the needle at a great distance.

A similar effect is observed near the Feroe Islands in the North Sea; the compass has no determined direction when brought on shore. *Journ des Sçavans*, 1679, p. 174.

In Hudson's Straits, in latitude 63° , the needle has hardly any polarity. *Ellis's Voyage to Hudson's Bay*.

Bouguer observed the same thing in Peru. Nay, we believe that almost all rocks, especially of whin or trappe stone, contain iron in a proper state.

All this refers only to the thin crust through which the human eye has occasionally penetrated. Of what may be below we are ignorant; but when we see appearances which tally so remarkably with what would be the effects of great masses of magnetical bodies, modifying the general and regularly progressive action of a primitive magnet, whose existence and motion is inconsistent with nothing that we know of

Variation. of this globe, this manner of accounting for the observed change of variation has all the probability that we can desire. Nay, we apprehend that very considerable changes may be produced in the direction of the compass needle even without the supposition of any internal motion. If the great magnet resembles many loadstones we are acquainted with, having more than two poles, we know that these poles will act on each other, and gradually change each other's force, and consequently the direction of the compass. This process, to be sure, tends to a state of things which will change no more. — But the period of human history, or of the history of the race of Adam, may make but a small part of the history of this globe; and therefore this objection is of little force.

There can be no doubt of the operation of the general terrestrial magnetism on every thing susceptible of magnetic properties; and we cannot hesitate to explain in this way many changes of magnetic direction which have been observed. Thus, in Italy, Father de la Torr  observed, that during a great eruption of Vesuvius the variation was 16° in the morning, at noon it was 14° , and in the evening it was 10° , and that it continued in that state till the lava grew so dark as no longer to be visible in the night; after which it slowly increased to $13\frac{1}{2}^\circ$, where it remained. Daniel Bernoulli found the needle change its position $45'$ by an earthquake. Professor Muller at Mannheim observed that the declination of the needle in that place was greatly affected by the earthquake in Calabria. Such streams of lava as flowed from Hekla in the last dreadful eruption must have made a transference of magnetic matter that would considerably affect the needle. But no observations seem to have been made on the occasion; for we know that common iron-stone, which has no effect on the needle, will, by mere cementation with any inflammable substance, become magnetic. In this way Dr Knight sometimes made artificial loadstones. — But these are partial things, and not connected with the general change of variation now under consideration.

We have said so much on this subject, chiefly with the view of cautioning our readers against too sanguine expectations from any pretensions to the solution of this great problem. We may certainly gather from these observations, that even although the theory of the variation should be completed, we must expect (by what we already know of magnetism in general) that the disturbances of the needle, by local causes intervening between it and the great influence by which it is chiefly directed, may be so considerable as to affect the position of the compass needle in a very sensible manner: for we know that the metallic substances in the bowels of the earth are in a state of continual change, and this to an extent altogether unknown.

There is another irregularity of the mariner's needle that we have taken no notice of, namely, the daily variation. This was first observed by Mr George Graham in 1722 (*Philosophical Transactions*, n^o 383), and reported to the Royal Society of London. It usually moves (at least in Europe) to the westward from 8 morning till 2 P. M. and then gradually returns to its former situation. The diurnal variations are seldom less than $0^\circ 5'$, and often much greater. Mr Graham mentions (*Philosophical Transactions*, n^o 428) some observations by a Captain Hume, in a voyage to America, where he found the variation greatest in the afternoon. This being a general phenomenon, has also attracted the attention of philosophers. The most detailed accounts of it to be met with are those of Mr Canton, in *Philosophical Transactions*, Vol. LI. Part 1. p. 399, and those of Van Swinden, in his *Treatise on Electricity and Magnetism*.

It appears from Canton's observations, that although there be great irregularities in this diurnal change of posi-

tion of the mariner's needle, there is a certain average, which is kept up with considerable steadiness. The following table shows the average of greatest daily change of position in the different months of the year, observed in Mr Canton's house, Spital Square, in 1759.

January	7'. 8"	July	13'. 14"
February	8. 58	August	12. 19
March	11. 27	Sept.	11. 43
April	12. 26	October	10. 36
May	13. —	Nov.	8. 9
June	13. 21	Dec.	6. 58

Mr Canton attempts to account for these changes of position, by observing that the force of a magnet is weakened by heat. A small magnet being placed near a compass needle, ENE from it, so as to make it deflect 45° from the natural position, the magnet was covered with a brass vessel, into which hot water was poured. The needle gradually receded from the magnet $\frac{1}{4}$ ths of a degree, and returned gradually to its place as the water cooled. This is confirmed by uniform experience.

The parts of the earth to the eastward are first heated in the morning, and therefore the force of the earth is weakened, and the needle is made to move to the westward. But as the sun warms the western side of the earth in the afternoon, the motion of the needle must take the contrary direction.

But this way of explaining by a change in the force of the earth supposes that the changing cause is acting in opposition to some other force. We do not know of any such. The force, whatever it is, seems simply to produce its own effect, in deranging the needle from the direction of terrestrial magnetism. If *Æpinus's* theory of magnetic action be admitted, viz. that a bar of steel has magnetism induced on it by propelling the quiescent and mutually repelling particles of magnetic fluid to one end, or attracting them to the other, we may suppose that the sun acts on the earth as a magnet acts on a piece of soft iron, and in the morning propels the fluid in the north-west parts. The needle directs itself to this constipated fluid, and therefore it points to the eastward of the magnetic north in the afternoon. And (to abide by the same theory) this induced magnetism will be somewhat greater when the earth is warmer; and therefore the diurnal variation will be greatest in summer. This change of position of the constipated fluid must be supposed to bear a very small ratio to the whole fluid, which is naturally supposed to be constipated in one pole of the great magnet in order to give it magnetism. Thus we shall have the diurnal variation a very small quantity. This is departing, however, from the principle of Mr Canton's explanation; and indeed we cannot see how the weakening the general force of the terrestrial magnet should make any change in the needle in respect to its direction; nor does it appear probable that the change of temperature produced by the sun will penetrate deep enough to produce any sensible effect on the magnetism. And if this be the cause, we think that the derangements of the needle should vary as the thermometer varies, which is not true. The other method of explaining is much better, if *Æpinus's* theory of magnetic attraction and repulsion be just; and we may suppose that it is only the secondary magnetism (*i. e.* that of the magnetisable minerals) that is sensibly affected by the heat; this will account very well for the greater mobility of the fluid in summer than in winter.

A great objection to either of these explanations is the prodigious diversity of the diurnal variations in different places. This is so very great, that we can hardly ascribe the diurnal variation to any change in the magnetism of the primitive

Variation, primitive terrestrial magnet, and must rather look for its cause in local circumstances. This conclusion becomes more probable, when we learn that the deviation from the meridian and the deviation from the horizontal line are not affected at the same time. Van Swinden ascribes them solely to changes produced on the needles themselves. If their magnetism be greatly deranged by the sun's position, it may throw the magnetic centre away from the centre of the needle's motion, and thus may produce a very small change of position. But if this be the cause, we should expect differences in different needles. Van Swinden says, that there are such, and that they are very great; but as he has not specified them, we cannot draw any conclusion.

But, besides this regular diurnal variation, there is another, which is subjected to no rule. The aurora borealis is observed (in Europe) to disturb the needle exceedingly, sometimes drawing it several degrees from its position. It is always observed to increase its deviation from the meridian, that is, an aurora borealis makes the needle point more westerly. This disturbance sometimes amounts to six or seven degrees, and is generally observed to be greatest when the aurora borealis is most remarkable.

This is a very curious phenomenon, and we have not been able to find any connection between this meteor and the position of a magnetic needle. It is to be observed, that a needle of copper or wood, or any substance besides iron, is not affected. We long thought it an electric phenomenon, and that the needle was affected as any other body balanced in the same manner would be; but a copper needle would then be affected. Indeed it may still be doubted whether the aurora borealis be an electric phenomenon. They are very frequent and remarkable in Sweden; and yet Bergman says, that he never observed any electric symptoms about them, though in the mean time the magnetic needle was greatly affected.

We see the needle frequently disturbed both from its general annual position, and from the change made on it by the diurnal variation. This is probably the effect of auroræ boreales which are invisible, either on account of thick weather or day-light. Van Swinden says, he seldom or never failed to observe auroræ boreales immediately after any anomalous motion of the needle; and concluded that there had been one at the time, though he could not see it. Since no needle but a magnetic one is affected by the aurora borealis, we may conclude that there is some natural connection between this meteor and magnetism. This should farther incite us to observe the circumstance formerly mentioned, *viz.* that the south end of the dipping needle points to that part of the heavens where the rays of the aurora appear to converge. We wish that this were diligently observed in places which have very different variation and dip of the mariner's needle.

For the diurnal and this irregular variation, consult the Dissertations of Celsius and of Hiorter, in the *Memoirs of Stockholm*; Wargentin, *Philosophical Transactions*, Vol. 48. Braun (*Comment. Petropol. Novi*, T. V. VII. IX); Graham and Canton as above.

VARIETY, a change, succession, or difference, in the appearance or nature of things; in opposition to *uniformity*.

VARIETY, in botany, is a change in some less essential part or quality; as colour, size, pubescence or age.—Externally; by the plaiting or interweaving of the branches—by bundling or uniting of several stalks into one broad flat one; by the greater breadth, or narrowness, or curling of leaves—by becoming awnless, or smooth, or hirsute. Internally; by becoming mutilated in the corolla; or having one larger than ordinary.—by luxuriance, multiplication, or

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fulness—by becoming prolific, or crested—by bearing bulbs instead of seeds—or being viviparous.

The usual causes of variation are, climate, soil, exposure, heat, cold, winds, culture.

VARIOLA, the SMALL-POX. See MEDICINE, n° 222—224.

VARIX, in medicine, the dilatation of a vein, arising from the too great abundance or thickness of the blood.

VARNISH, a clear limpid fluid, capable of hardening without losing its transparency, used by painters, gilders, &c. to give a lustre to their works, to preserve them and defend them from the air.

A coat of varnish ought to possess the following properties: 1. It must exclude the action of the air; because wood and metals are varnished to defend them from decay and rust. 2. It must resist water; for otherwise the effect of the varnish could not be permanent. 3. It ought not to alter such colours as are intended to be preserved by this means. It is necessary therefore that a varnish should be easily extended or spread over the surface, without leaving pores or cavities; that it should not crack or scale; and that it should resist water. Now resins are the only bodies that possess these properties. Resins consequently must be used as the bases of varnish. The question which of course presents itself must then be, how to dispose them for this use? and for this purpose they must be dissolved, as minutely divided as possible, and combined in such a manner that the imperfections of those which might be disposed to scale may be corrected by others.

Resins may be dissolved by three agents. 1. By fixed oil. 2. By volatile oil. 3. By alcohol. And accordingly we have three kinds of varnish: the fat or oily varnish, essential varnish, and spirit varnish. Before a resin is dissolved in a fixed oil, it is necessary to render the oil drying. For this purpose the oil is boiled with metallic oxides; in which operation the mucilage of the oil combines with the metal, while the oil itself unites with the oxygen of the oxide. To accelerate the drying of this varnish, it is necessary to add oil of turpentine. The essential varnishes consist of a solution of resin in oil of turpentine. The varnish being applied, the essential oil flies off, and leaves the resin. This is used only for paintings. When resins are dissolved in alcohol, the varnish dries very speedily, and is subject to crack; but this fault is corrected by adding a small quantity of turpentine to the mixture, which renders it brighter, and less brittle when dry.

We shall now give the method of preparing a number of varnishes for different purposes.

A Varnish for Toilet-boxes, Cases, Fans, &c.—Dissolve two ounces of gum mastich and eight ounces of gum sandarach in a quart of alcohol; then add four ounces of Venice turpentine.

A Varnish for Wainscots, Cane-chairs, Iron-chairs, Grates.—Dissolve in a quart of alcohol eight ounces of gum sandarach, two ounces of seed lac, four ounces of rosin; then add six ounces of Venice turpentine. If the varnish is wished to produce a red colour, more of the lac and less of sandarach should be used, and a little *dragon's blood* should be added. This varnish is so thick that two layers of it are equal to four or five of another.

A Varnish for Fiddles, and other Musical Instruments.—Put four ounces of gum sandarach, two ounces of lac, two ounces of gum mastich, an ounce of gum elemi, into a quart of alcohol, and hang them over a slow fire till they are dissolved; then add two ounces of turpentine.

Varnish in order to employ Vermilion for painting Equipages.—Dissolve in a quart of alcohol six ounces of sandarach,

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three ounces of gum lac, and four ounces of rosin; afterwards add six ounces of the cheapest kind of turpentine; mix with it a proper quantity of vermilion when it is to be used.

Gold-coloured Varnish.—Pound separately four ounces of stick lac, four ounces of gamboge, four ounces of dragon's blood, four ounces of anotta, and one ounce of saffron: put each of them separately into a quart of alcohol, and expose them for five days in a narrow-mouthed bottle to the sun, or keep them during that time in a very warm room, shaking them every now and then to hasten the solution. When they are all melted, mix them together. More or less of each of these ingredients will give the different tints of gold according as they are combined. In order to make silver imitate gold exactly when covered with this varnish, the quantity of ingredients must be somewhat greater. The method of gilding silver-leaf, &c. with this varnish is as follows: The silver-leaf being fixed on the subject, in the same manner as gold-leaf, by the interposition of proper glutinous matters, the varnish is spread upon the piece with a brush or pencil. The first coat being dry, the piece is again and again washed over with the varnish till the colour appears sufficiently deep. What is called *gilt leather*, and many picture frames, have no other than this counterfeit gilding. Washing them with a little rectified spirit of wine affords a proof of this; the spirit dissolving the varnish, and leaving the silver leaf of its own whiteness. For plain frames, thick tin-foil may be used instead of silver. The tin-leaf, fixed on the piece with glue, is to be burnished, then polished with emery and a fine linen cloth, and afterwards with putty applied in the same manner: being then lacquered over with the varnish five or six times, it looks very nearly like burnished gold. The same varnish, made with a less proportion of the colouring materials, is applied also on works of brass; both for heightening the colour of the metal to a resemblance with that of gold, and for preserving it from being tarnished or corroded by the air.

Oil Varnishes.—Gum copal and amber are the substances principally employed in oil varnishes; they possess the properties necessary for varnishes, solidity and transparency.—The copal being whitest, is used for varnishing light, the amber for dark colours. It is best to dissolve them before mixing them with the oil, because by this means they are in less danger of being scorched, and at the same time the varnish is more beautiful. They should be melted in a pot on the fire; they are in a proper state for receiving the oil when they give no resistance to the iron spatula, and when they run off from it drop by drop. The oil employed should be a drying oil, and perfectly free from grease. It should be poured into the copal or amber by little and little, constantly stirring the ingredients at the same time with the spatula. When the oil is well mixed with the copal or amber, take it off the fire; and when it is pretty cool, pour in a greater quantity of the essence of turpentine than the oil that was used. After the varnish is made, it should be passed through a linen cloth. Oil varnishes become thick by keeping; but when they are to be used, it is only necessary to pour in a little essence of turpentine, and to put them for a little on the fire. The turpentine is necessary in oil varnishes to make them dry properly; generally twice as much of it is used as of oil. Less is necessary in summer than in winter. Too much oil hinders the varnish from drying; but when too little is used, it cracks and does not spread properly. We shall subjoin the most useful oil varnishes:

White Copal Varnish.—On 16 ounces of melted copal pour four, six, or eight ounces of linseed oil, boiled and quite free from grease. When they are well mixed, take

them off the fire (not forgetting to stir them properly); and when pretty cool, pour in 16 ounces of the essence of Venice turpentine. Pass the varnish through a cloth.—Amber varnish is made in the same way.

Black Varnish for Coaches and Iron Work.—This varnish is composed of bitumen of Palestine, rosin, and amber, melted separately, and afterwards mixed; the oil is then added, and afterwards the turpentine, as directed above. The usual proportions are, 12 ounces of amber, two ounces of rosin, two ounces of bitumen, six of oil, and 12 of the essence of turpentine.—Golden-coloured varnish may be made also by substituting linseed oil for alcohol.

Essential Oil Varnishes.—The only essential oil varnishes used are for pictures. Picture varnishes should be white, light, and quite transparent, which will preserve the colours without giving them any disagreeable tint; and it should be possible to take them off the picture without injuring it. They are usually made of gum mastich and turpentine dissolved together in some essential oil. The varnish is passed through a cloth, and allowed to clarify. It is applied cold to the picture.

Varnish for Glass, in order to preserve it from the Rays of the Sun.—Pulverise a quantity of gum adragant, and let it dissolve for 24 hours in the white of eggs well beat up; then rub it gently on the glass with a brush.

Varnishes before they are used should be carefully kept from dust, which would spoil them; and they should be kept in a vessel quite clean and dry. When used, they should be lifted lightly with a brush, and spread upon a ground altogether free from dirt and moisture. The substance, after being varnished, should be exposed to the heat of the sun, or placed in a warm room covered with a glass case, to keep out all filth. Oil varnishes require more heat than alcohol varnishes. The varnish should be put on very quickly, making great strokes with the pencil or brush, taking care that these strokes never cross one another; it should be spread equally, and never thicker than a leaf of paper; a second coat should not be put on till the first is quite dry. If the varnish, after being put on, becomes dull and uneven, it must be taken off entirely, and new varnish put on.

When wainscot is to be varnished, it is first painted of a wooden colour. This colour is made by infusing in water either red or yellow ochre (according to the colour wished for), terra ombria (a kind of ochre) and white lead; into this as much as necessary is put of *parchment paste*. Two thin coats of this are to be put on, and, after they are quite dry, the varnish.

Varnishes are polished with pumice-stone and tripoli earth. The pumice-stone must be reduced to an impalpable power, and put upon a piece of serge moistened with water; with this the varnished substance is to be rubbed lightly and equally. The tripoli must also be reduced to a very fine powder, and put upon a clean woollen cloth moistened with olive oil, with which the polishing is to be performed. The varnish is then to be wiped with soft linen, and, when quite dry, cleaned with starch or Spanish white, and rubbed with the palm of the hand or with a linen cloth.

To recover colours or varnish, and to take off the dirt and filth which may adhere to them, a ley is used made of potash and the ashes of lees of wine. Take 48 ounces of potash, and 16 of the above-mentioned ashes, and put them into six quarts of water, and the ley is made: instead of the ashes an equal quantity of potash would probably do as well. To clean dirty colours, dilute some of this ley with four times its quantity of water, and rub the picture with it; then wash it with river water; and when dry, give it a coat

Varnish. coat or two of varnish. In order to take off a varnish, wash it with the above mentioned ley, then with water, and then lift it off the substance on which it was with any iron instrument.—We shall finish this article with a description of the famous Chinese varnish.

The Chinese varnish is not a composition, but a resin which exudes from a tree called in China *tsi-chu*, “varnish tree.” This tree grows in several provinces of the southern parts of China. The Chinese take the following method of propagating this tree: In spring they choose a vigorous shoot about a foot in length, which proceeds immediately from the trunk; and coat over the lower part, by which it adheres to the tree, with a kind of yellow earth, at least three inches in thickness. This coat is carefully covered with a mat, to defend it from rain and the injuries of the air. Towards the autumnal equinox they detach a little of the earth, to observe in what condition the small roots are, which begin to spring forth from the shoot. If they find that the filaments which compose them are of a reddish colour, they judge it is time to make an amputation; but they defer it if the roots are white, because this colour shows that they are yet too tender: they then close up the coat again, and wait till the spring following. When the shoot is separated from the trunk of the tree, it is put into the earth; but in whatever season it is planted, whether in spring or autumn, great care must be taken to put plenty of cinders into the hole prepared for it; without this precaution the ants would destroy the yet tender roots, or at least deprive them of all their moisture, and cause them to decay.

The Chinese do not procure varnish from the *tsi-chu* until its trunk is nearly five inches in diameter, which size it seldom attains to before seven or eight years. Varnish extracted from a tree smaller or of less age would not have the same body and splendor. This liquor distils only in the night-time, and during the summer season. To cause the gum to flow, they make several rows of incisions round the trunk, the number of which is proportioned to the vigour of the tree. The first row is seven inches from the earth, and the rest are at the same distance one from the other, and continue to the top of the trunk, and even sometimes on the boughs which are of a sufficient strength and size. The Chinese use a crooked iron for making these incisions, which must run a little obliquely, and be equal in depth to the thickness of the bark; they make them with one hand, and with the other hold a shell, the edges of which they insert into the opening, where it remains without any support. These incisions are made towards evening, and next morning they collect the varnish which has fallen into the shells; the following evening they are again inserted, and this operation is continued until the end of summer. A thousand trees yield almost in one night 20 pounds of varnish.

While the varnish distils, it exhales a malignant vapour, the bad effects of which can only be prevented by preservatives and great precaution. The merchant who employs the workmen is obliged to keep by him a large vase filled with rape-oil, in which a certain quantity of those fleshy filaments have been boiled that are found in hog's lard, and which do not melt. When the workmen are going to fix the shells to the trees, they carry some of this oil along with them, and rub their face and hands with it, which they do with greater care when they collect in the morning the varnish that has distilled during night. After eating, they wash their whole bodies with warm water, in which the bark of the chefnut-tree, fir-wood, crystallised saltpetre, and some other drugs, have been boiled. When they are at work near the trees, they put upon their heads a small cloth bag

in which there are two holes, and cover the fore-part of their bodies with a kind of apron made of doe-skin, which is suspended from their necks with strings, and tied round them with a girdle. They also wear boots, and have coverings on their arms, made of the same kind of skin. The labourer who should attempt to collect varnish without using this precaution, would soon be punished for his rashness, and the most dreadful effects would ensue. The disorder shows itself by tetters, which become of a bright red colour, and spread in a very short time; the body afterwards swells, and the skin bursts and appears covered with an universal leprosy. The unhappy wretch could not long endure the excruciating pains which he feels, did he not find a speedy remedy in those preservatives which are used against the malignant and noxious exhalations of the varnish.

The season of collecting varnish being ended, the merchant puts it into small casks closely stopped. A pound of it newly made costs him about one shilling and eight pence Sterling; but he gains *cent. per cent.* upon it, and sometimes more, according to the distance of the place to which he transports it.

Besides the lustre and beauty which that varnish gives to many of the Chinese manufactures, it has also the property of preserving the wood upon which it is laid, especially if no other matter be mixed with it. It prevents it from being hurt either by dampness or worms.

Every workman has a particular art and method of using the varnish. This work requires not only much skill and dexterity, but also great attention, to observe the proper degree of fluidity which the gum ought to have, as it must be neither too thick nor too liquid when it is laid on. Patience above all is necessary in those who wish to succeed. To be properly varnished, a work must be done at leisure; and a whole summer is scarcely sufficient to bring it to perfection. It is therefore rare to see any of those cabinets which are imported to us from Canton so beautiful and durable as those manufactured in Japan, Tong-king, and Nang king, the capital of the province of Kiang-nan: not that the artists do not employ the same varnish; but as they work for Europeans, who are more easily pleased, they do not take the trouble of giving the pieces which come from their hands all the polish they are capable of receiving.

There are two methods of laying on the varnish; the simplest is, when it is immediately laid on the wood. The work is first polished, and then daubed over with a kind of oil which the Chinese call *tong-yeou*. When this oil is dry, it receives two or three coats of varnish; which remain so transparent, that all the shades and veins of the wood may be seen through them. If the artist is desirous of entirely concealing the substance on which they are laid, nothing is necessary but to add a few more coats; these give the work a shining surface, the smoothness of which equals that of the most beautiful ice. When the work is dry, various figures are painted upon it in gold and silver, such as flowers, birds, trees, temples, dragons, &c. A new coat of varnish is then sometimes laid over these figures, which preserves them, and adds much to their splendor. The second method requires more preparation. The Chinese workmen fix to the wood by means of glue a kind of pasteboard, composed of paper, hemp, lime, and other ingredients, well beaten, that the varnish may incorporate with them. Of this they make a ground perfectly smooth and solid, over which the varnish is laid in thin coats, that are left to dry one after the other.

It often happens, that the lustre of varnished tables and other pieces of furniture is insensibly destroyed by tea and warm liquors. “The secret of restoring to varnish its shining

Varnish,
Varro.

ning black colour (says a Chinese author) is to expose it for one night to a white hoar-frost, or to cover it some time with snow." For a method of imitating *Chinese varnish*, see TURNING.

VARNISH also signifies a sort of shining coat, wherewith potter's ware, delft-ware, china-ware, &c. are covered, which gives them a smoothness and lustre. Melted lead is generally used for the first, and smalt for the second. See GLAZING.

VARNISH, among medalists, signifies the colours antique medals have acquired in the earth.

The beauty which nature alone is able to give to medals, and art has never yet attained to counterfeit, enhances the value of them: that is, the colour which certain soils in which they have a long time lain tinges the metals withal: some of which are blue, almost as beautiful as the torquoise; others with an inimitable vermilion colour; others with a certain shining polished brown, vastly finer than Brasil figures.

The most usual varnish is a beautiful green, which hangs to the finest strokes without effacing them, more accurately than the finest enamel does on metals.

No metal but brass is susceptible of this; for the green rust that gathers on silver always spoils it, and it must be got off with vinegar or lemon juice.

Falsifiers of medals have a false or modern varnish, which they use on their counterfeits, to give them the appearance or air of being antique. But this may be discovered by its softness; it being softer than the natural varnish, which is as hard as the metal itself.

Some deposit their spurious metals in the earth for a considerable time, by which means they contract a sort of varnish, which may impose upon the less knowing; others use sal ammoniac, and others burnt paper.

VARRO (Marcus Terentius), the most learned of all the Romans, was born 28 years B. C. He was a senator of the first distinction, both for birth and merit; and bore many great offices. He was an intimate friend of Cicero; and this friendship was confirmed and immortalized by a mutual dedication of their learned works to each other. Thus Cicero dedicated his Academic Questions to Varro; and Varro dedicated his treatise on the Latin tongue to Cicero. In the civil wars he was zealously attached to Pompey; but after his defeat soon submitted to Cæsar, who was reconciled to him. Afterwards he applied his whole time to letters, and had the charge of the Greek and Latin libraries at Rome. He was above 70 when Antony proscribed him; however, he found means to escape and save his life, though he could not save some of his works and his library from being plundered by the soldiers. After this storm was over, he pursued his studies as usual; and Pliny relates, that he continued to study and to write when he was 88 years of age. He was 80 when he wrote his three books *De re Rustica*, which are still extant. Five of his books *De lingua Latina*, which he addressed to Cicero, are also extant. There remain, too, divers fragments of his works, particularly of his Menippean Satires, which are medleys of prose and verse; and Scalliger has collected some of his epigrams from among the *Cataleſta Virgilii*. His books *De lingua Latina*, and *De re Rustica*, were printed with the notes of Joseph Scaliger, Turnebus, and Victorius, by Henry Stephens at Paris, 1573, in 8vo, and have been published separately since among the *Auctores de lingua Latina*, and the *Auctores de re Rustica*.

There was another Varro of antiquity, called *Atacinus*, who was born about 10 years after the first, at a small town near Narbonne. Though infinitely below the Roman in learning, he was at least as good, if not a better, poet; which perhaps has made Lilius Gyraldus and other critics

confound them. He composed many works in verse; some fragments of which were collected, and published with those of other ancient poets, at Lyons in 1603. His chief works were, A poem on the war with the Sequani, a people of Gaul; and the *Astronomics*, that went under the name of *Planciades the grammarians*. But the *Argonautics*, in four books, was what gained him the greatest reputation: and though indeed nothing but a translation of Apollonius Rhodius, yet was so well done as to be commended by Quintilian.

VARRONIA, in botany: A genus of plants belonging to the class of *pentandria*, and to the order of *monogynia*; and arranged in the natural system under the 41st order, *Asperifolia*. The corolla is quinquefid; the fruit a drupa, with a quadrilocular kernel. There are six species; none of which are natives of Britain.

VASCULAR, something consisting of divers vessels, as arteries, veins, &c.

VASE, a term frequently used for ancient vessels dug from under ground, or otherwise found, and preserved in the cabinets of the curious. In architecture, the appellation *vase* is also given to those ornaments placed on corniches, fochles, or pedestals, representing the vessels of the ancients, particularly those used in sacrifice, as incense-pots, flower-pots, &c. See *PORTLAND-Vase*.

VASSAL, in our ancient customs, signified a tenant or feudatory; or person who vowed fidelity and homage to a lord, on account of some land, &c. held of him in fee; also a slave or servant, and especially a domestic of a prince.—*Vassallus* is said to be *quasi inferior socius*; as the vassal is inferior to his master, and must serve him; and yet he is in a manner his companion, because each of them is obliged to the other. See *FEODAL-System*.

VATICAN, a magnificent palace of the pope, in Rome, which is said to consist of several thousand rooms: but the parts of it most admired are the grand staircase, the pope's apartment, and especially the library, which is one of the richest in the world, both in printed books and manuscripts.

VAUBAN (Sebastian le Prestre, seigneur de), marshal of France, and the greatest engineer that country ever produced, was born in 1633. He displayed his knowledge of fortification in the courie of many sieges, and his services were rewarded with the first military honours. He was made governor of Lisle in 1668, commissary-general of the fortifications of France in 1678, governor of the maritime parts of Flanders in 1689, and a marshal of France in 1703. He died in 1707, after having brought the arts of attacking and defending fortified places to a degree of perfection unknown before. His writings on these subjects are in the highest esteem.

VAUDOIS, VALDENSES, or *Waldenses*, in ecclesiastical history, a name given to a sect of reformers, who made their first appearance about the year 1160.

The origin of this famous sect, according to Mosheim, was as follows: Peter, an opulent merchant of Lyons, surnamed *Valdensis*, or *Validifus*, from Vaux or Waldum, a town in the marquisate of Lyons, being extremely zealous for the advancement of true piety and Christian knowledge, employed a certain priest called *Stephanus de Evija*, about the year 1160, in translating from Latin into French the four Gospels, with other books of Holy Scripture, and the most remarkable sentences of the ancient doctors, which were so highly esteemed in this century. But no sooner had he perused these sacred books with a proper degree of attention, than he perceived that the religion which was now taught in the Roman church, differed totally from that which was originally inculcated by Christ and his apostles.

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Vaudois.

Vaudois. Struck with this glaring contradiction between the doctrines of the pontiffs and the truths of the Gospel, and animated with zeal, he abandoned his mercantile vocation, distributed his riches among the poor (whence the Waldenses were called *poor men of Lyons*), and forming an association with other pious men, who had adopted his sentiments and his turn of devotion, he began in the year 1180 to assume the quality of a public teacher, and to instruct the multitude in the doctrines and precepts of Christianity.

Soon after Peter had assumed the exercise of his ministry, the archbishop of Lyons, and the other rulers of the church in that province, vigorously opposed him. However, their opposition was unsuccessful; for the purity and simplicity of that religion which these good men taught, the spotless innocence that shone forth in their lives and actions, and the noble contempt of riches and honours which was conspicuous in the whole of their conduct and conversation, appeared so engaging to all such as had any sense of true piety, that the number of their followers daily increased.— They accordingly formed religious assemblies, first in France, and afterwards in Lombardy, from whence they propagated their sect throughout the other provinces of Europe with incredible rapidity, and with such invincible fortitude, that neither fire, nor sword, nor the most cruel inventions of merciless persecution, could damp their zeal, or entirely ruin their cause.

The attempts of Peter Waldus and his followers were neither employed nor designed to introduce new doctrines into the church, nor to propose new articles of faith to Christians. All they aimed at was, to reduce the form of ecclesiastical government, and the manners both of the clergy and people, to that amiable simplicity and primitive sanctity that characterised the apostolic ages, and which appear so strongly recommended in the precepts and injunctions of the divine Author of our holy religion. In consequence of this design, they complained that the Roman church had degenerated, under Constantine the Great, from its primitive purity and sanctity. They denied the supremacy of the Roman pontiff, and maintained, that the rulers and ministers of the church were obliged, by their vocation, to imitate the poverty of the apostles, and to procure for themselves a subsistence by the work of their hands. They considered every Christian as, in a certain measure, qualified and authorised to instruct, exhort, and confirm the brethren in their Christian course, and demanded the restoration of the ancient penitential discipline of the church, *i. e.* the expiation of transgressions by prayer, fasting, and alms, which the new-invented doctrine of indulgences had almost totally abolished. They at the same time affirmed, that every pious Christian was qualified and entitled to prescribe to the penitent the kind or degree of satisfaction or expiation that their transgressions required; that confession made to priests was by no means necessary, since the humble offender might acknowledge his sins, and testify his repentance, to any true believer, and might expect from such the counsel and admonition which his case demanded. They maintained, that the power of delivering sinners from the guilt and punishment of their offences belonged to God alone; and that indulgences of consequence were the criminal inventions of sordid avarice. They looked upon the prayers and other ceremonies that were instituted in behalf of the dead, as vain, useless, and absurd, and denied the existence of departed souls in an intermediate state of purification; affirming, that they were immediately, upon their separation from the body, received into heaven, or thrust down to hell. These, and other tenets of a like nature, composed the system of doctrine propagated by the Waldenses. It is also said that several of the Waldenses denied the obligation of infant-

baptism, and that others rejected water-baptism entirely; but Wall has laboured to prove that infant-baptism was generally practised among them.

Their rules of practice were extremely austere; for they adopted as the model of their moral discipline the sermon of Christ on the mount, which they interpreted and explained in the most rigorous and literal manner, and consequently prohibited and condemned in their society all wars, and suits of law, and all attempts towards the acquisition of wealth, the inflicting of capital punishments, self-defence against unjust violence, and oaths of all kinds.

During the greatest part of the 17th century, those of them who lived in the valleys of Piedmont, and who had embraced the doctrine, discipline, and worship of the church of Geneva, were oppressed and persecuted, in the most barbarous and inhuman manner, by the ministers of Rome. This persecution was carried on with peculiar marks of rage and enormity in the years 1655, 1656, and 1696, and seemed to portend nothing less than the total extinction of that unhappy nation. The most horrid scenes of violence and bloodshed were exhibited in this theatre of papal tyranny; and the few Waldenses that survived were indebted for their existence and support to the intercession made for them by the English and Dutch governments, and also by the Swiss cantons, who solicited the clemency of the duke of Savoy in their behalf.

VAULT, in architecture, an arched roof, so contrived that the stones which form it sustain each other.

Vaults are on many occasions to be preferred to soffits or flat ceilings, as they give a greater height and elevation, and are besides more firm and durable.

VAYER. See **MOTHE**.

VAYVODE, or **VAIVODE**. See **WAYWODE**.

UBES (St), a sea-port town of Portugal, in the province of Estremadura, seated on a bay of the Atlantic Ocean, 21 miles south of Lisbon. It stands on an eminence, with a very strong castle built on a rock. The soil about it is fertile in corn, wine, and fruits; and it is furnished with good fish from the sea, and a small lake in the neighbourhood. Here they make great quantities of fine salt, which is carried to the American plantations. E. Long. 8. 54. N. Lat. 38. 22.

UBIQUITARIANS, formed from *ubique*, “everywhere,” in ecclesiastical history, a sect of Lutherans which rose and spread itself in Germany; and whose distinguishing doctrine was, that the body of Jesus Christ is everywhere, or in every place.

Brentius, one of the earliest reformers, is said to have first broached this error, in 1560. Luther himself, in his controversy with Zuinglius, had thrown out some unguarded expressions, that seemed to imply a belief of the omnipresence of the body of Christ; but he became sensible afterwards, that this opinion was attended with great difficulties, and particularly that it ought not to be made use of as a proof of Christ’s corporal presence in the eucharist. However, after the death of Luther, this absurd hypothesis was renewed, and dressed up in a specious and plausible form by Brentius, Chemnitius, and Andreas, who maintained the communication of the properties of Christ’s divinity to his human nature. It is indeed obvious, that every Lutheran who believes the doctrine of consubstantiation (see *SUPPER of the Lord*), whatever he may pretend, must be an Ubiquitarian.

UBIQUITY, **OMNIPRESENCE**; an attribute of the Deity, whereby he is always intimately present to all things; gives the *esse* to all things; knows, preserves, and does all in all things.

UDDER, in comparative anatomy, that part in brutes wherein

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Udder.

Vedas
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Veering.

wherein the milk is prepared, answering to the mammæ or breasts in women. See COMPARATIVE ANATOMY, n° 44.

VEDAS, the sacred books of the Hindoos, believed to be revealed by God, and called *immortal*. They are considered as the fountain of all knowledge human and divine, and are four in number; of which we have the following account in the first volume of the Asiatic Researches: The *Rigveda* consists of five sections; the *Yajurveda* of eighty-six; the *Samaveda* of a thousand; and the *At'harvaveda* of nine; with eleven hundred *śac'ha's*, or branches, in various divisions and subdivisions. The *Veda's* in truth are infinite; but have been long reduced to this number and order: the principal part of them is that which explains the duties of man in a methodical arrangement; and in the fourth is a system of divine ordinances.

From these are reduced the four *Upavedas*, the first of which was delivered to mankind by BRAHMA, INDRA, DHANWANTARI, and five other deities; and comprizes the theory of disorders and medicines, with the practical methods of curing diseases.

The second consists of music, invented for the purpose of raising the mind by devotion to the felicity of the Divine nature; the third treats of the fabrication and use of arms; and the fourth of *sixty-four* mechanical arts. Of however little value we may esteem the mechanical arts of the Hindoos, and however despicable their theological system may really be, the *Upaveda*, which treats of diseases and the method of curing them, surely deserves to be studied by every European physician practising in India. There are indeed a great number of medical books in the Sanscrit language worthy of attention; for though the theories of their authors may be groundless and whimsical, they contain the names and description of many Indian plants and minerals, with their uses, discovered by *experience*, in the cure of diseases.

VEDETTE, in war, a centinel on horseback, with his horse's head towards the place whence any danger is to be feared, and his carbine advanced, with the butt-end against his right thigh. When the enemy has encamped, there are vedettes posted at all the avenues, and on all the rising grounds, to watch for its security.

To VEER and HAUL, to pull a rope tight, by drawing it in and slackening it alternately, till the body to which it is applied acquires an additional motion, like the increased vibrations of a pendulum, so that the rope is straitened to a greater tension with more facility and dispatch. This method is particularly used in hauling the bowlines.

The wind is said to veer and haul when it alters its direction, and becomes more or less fair. Thus it is said to veer aft and to haul forward.

VEER, *Ter-Veer*, anciently *Camp-Veer*, a town of Zealand in the United Provinces, standing at the mouth of the East Schelde, about four miles from Middelburgh, and eight from Flushing. Veer, in Dutch, signifies a passage or ferry over an arm of the sea or a river; and as there was once a ferry here over the Schelde to the village of Compen, on the island of North Beveland, the town thereby got the name of *Veer*, *Camp-Veer*, and *Ter-Veer*. It is well fortified, and formerly enjoyed a good trade, especially to Scotland; the natives enjoying particular privileges here. The harbour is very good, and the arsenal the best furnished in the world. Hence the Veres, anciently earls of Oxford, are said to have derived both their origin and name.

VEERING, or WEARING, the operation by which a ship, in changing her course from one board to the other, turns her stern to windward. Hence it is used in opposition to TACKING, wherein the head is turned to the wind

and the stern to leeward. See SEAMANSHIP, Vol. XVII. p. 219.

VEGA (Lopez de), a celebrated Spanish poet. He was the son of Felix de Vega and Francisca Fernandez, who were both descended from honourable families, and lived in the neighbourhood of Madrid. Our poet was born in that city on the 25th of November 1562. He was, according to his own expression, a poet from his cradle; and beginning to make verses before he had learned to write, he used to bribe his elder school-fellows with part of his breakfast, to commit to paper the lines he had composed. Having lost his father while he was yet still a child, he engaged in a frolic very natural to a lively boy, and wandered with another lad to various parts of Spain, till, having spent their money, and being conducted before a magistrate at Segovia for offering to sell a few trinkets, they were sent home again to Madrid. Soon after this adventure, our young poet was taken under the protection of Geronimo Manrique, bishop of Avila, and began to distinguish himself by his dramatic compositions, which were received with great applause by the public, though their author had not yet completed his education; for, after this period, he became a member of the university of Alcala, where he devoted himself for four years to the study of philosophy. He was then engaged as secretary to the duke of Alva, and wrote his *Arcadia* in compliment to that patron: who is frequently mentioned in his occasional poems. He quitted that employment on his marriage with Isabel de Urbina, a lady (says his friend and biographer Perez de Montalvan) beautiful without artifice, and virtuous without affectation. His domestic happiness was soon interrupted by a painful incident:—Having written some lively verses in ridicule of a person who had taken some injurious freedom with his character, he received a challenge in consequence of his wit; and happening, in the duel which ensued, to give his adversary a dangerous wound, he was obliged to fly from his family, and shelter himself in Valencia. He resided there a considerable time; but conjugal affection recalled him to Madrid. His wife died in the year of his return. His affliction on this event led him to relinquish his favourite studies, and embark on board the Armada which was then preparing for the invasion of England. He had a brother who served in that fleet as a lieutenant; and being shot in an engagement with some Dutch vessels, his virtues were celebrated by our afflicted poet, whose heart was peculiarly alive to every generous affection. After the ill success of the Armada, the disconsolate Lopez de Vega returned to Madrid, and became secretary to the Marquis of Malpica, to whom he has addressed a grateful sonnet. From the service of this patron he passed into the household of the Count of Lemos, whom he celebrates as an inimitable poet. He was once more induced to quit his attendance on the great, for the more inviting comforts of a married life. His second choice was Juana de Guardio, of noble birth and singular beauty. By this lady he had two children, a son who died in his infancy, and a daughter named *Felicianna*, who survived her father. The death of his little boy is said to have hastened that of his wife, whom he had the misfortune to lose in about seven years after his marriage. Having now experienced the precariousness of all human enjoyments, he devoted himself to a religious life, and fulfilled all the duties of it with the most exemplary piety: still continuing to produce an astonishing variety of poetical compositions. His talents and his virtues procured him many unsolicited honours. Pope Urban VIII. sent him the cross of Malta, with the title of Doctor in Divinity, and appointed him to a place of profit in the Apostolic Chamber; favours for which he expressed

Vega.

Hayley's
Works,
vol. ii.

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expressed his gratitude by dedicating his *Corona Tragica* (a long poem on the fate of Mary Queen of Scots) to that liberal pontiff. In his 73d year he felt the approaches of death, and prepared himself for it with the utmost composure and devotion. His last hours were attended by many of his intimate friends, and particularly his chief patron the Duke of Seffa, whom he had made his executor; leaving him the care of his daughter Feliciana, and of his various manuscripts. The manner in which he took leave of those he loved was most tender and affecting. He said to his disciple and biographer Montalvan, That true fame consisted in being good; and that he would willingly exchange all the applauses he had received to add a single deed of virtue to the actions of his life. Having given his dying benediction to his daughter, and performed the last ceremonies of his religion, he expired on the 25th of August 1635.

VEGETATION, in physiology, the act whereby plants receive nourishment and growth.

The process of nature in the vegetation of plants is very accurately delivered by Malpighi: The egg or seed of the plant being excluded out of the ovary, called *pod* or *husk*, and requiring further fostering and brooding, is committed to the earth; which having received it into her fertile bosom, not only does the office of incubation by her own warm vapours and exhalation, joined with the heat of the sun, but by degrees supplies what the seed requires for its further growth; as abounding everywhere with canals and sinuses, wherein the dew and rain water, impregnated with fertile salts, glide, like the chyle and blood in the arteries, &c. of animals. This moisture meeting with a new-deposited seed, is percolated, or strained through the pores or pipes of the outer rind or husk, corresponding to the secundines of the fœtuses, on the inside whereof lies one or more, commonly two, thick seminal leaves, answering to the placenta in women, and the cotyledons in brutes.

These seed-leaves consist of a great number of little vesiculæ, or bladders, with a tube corresponding to the navel-string in animals. In these vesiculæ is received the moisture of the earth, strained through the rind of the seed; which makes a slight fermentation with the proper juice before contained therein. This fermented liquor is conveyed by the umbilical vessel to the trunk of the little plant; and to the germ or bud which is contiguous thereto: upon which a vegetation and increase of the parts succeed.

Such is the procedure in the vegetation of plants: which the illustrious author exemplifies in a grain of wheat, as follows: The first day the grain is sown it grows a little turgid; and the secundine, or husk, gapes a little in several places: and the body of the plant, being continued by the umbilical vessel to a conglobated leaf (which is called the *pulp* or *flesh* of the seed, and is what constitutes the flower) swells; by which means, not only the germ or sprout (which is to be the future stem) opens, and waxes green, but the roots begin to bunch out; whence the placenta, or seed-leaf, becoming loose, gapes. The second day, the secundine or husk, being broke through, the stem, or top of the future straw, appears on the outside thereof, and grows upward by degrees; in the mean time, the seed-leaf guarding the roots becomes turgid with its vesiculæ, and puts forth a white down. And the leaf being pulled away, you see the roots of the plants bare; the future buds, leaves, and rest of the stalk, lying hid. Between the roots and the ascending stem the trunk of the plant is knit by the navel-knot to the flower-leaf, which is very moist, though it still retains its white colour and its natural taste. The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it received from the earth fermenting with its own,

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Thus the plant increasing in bigness, and its bud or stem becoming taller, from whitish turns greenish; the lateral roots also break forth greenish and pyramidal from the gapping sheath, which adheres chiefly to the plant; and the lower root grows longer and hairy, with many fibres shooting out of the same.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips; and these fibres are seen to wind about the saline particles of the soil, little lumps of earth, &c. like ivy; whence they grow curled. Above the lateral roots there now break out two other little ones.

The fourth day, the stem mounting upwards, makes a right angle with the seminal leaf: the last roots put forth more; and the other three growing larger, are clothed with more hairs, which straitly embrace the lumps of earth; and where they meet with any vacuity, unite into a kind of network.

From this time forward the root pushes with more regularity downward, and the stalk upward, than before. There is, however, this great difference in their growth, that the stalk and branches find no resistance to their shooting up, while the roots find a great deal to their shooting downward, by means of the solidity of the earth; whence the branches advance much faster and farther in their growth than the roots; and these last often finding the resistance of a tough earth unfurmountable, turn their course, and shoot almost horizontally.

From a number of experiments made by Mr Gough, and related by him in the fourth volume of the Manchester Transactions, it appears, that seeds will not vegetate without air; and that during their vegetation, they absorb oxygen, part of which they retain, and that carbonic acid is formed with the rest. These facts were ascertained in the following manner: He put several parcels of steeped peas and barley, at different times, into phials, which were left to stand for three or four minutes in spring water, of the heat of 46, 50°, to reduce them to a known temperature. They were then securely corked, and removed into a room, the temperature of which was never less than 53°. After remaining from four to six days in this situation, they were again placed in the same spring water, and opened in an inverted position, care being taken that the barometer stood at the time nearly where it did at first. When a cork was thus drawn, a quantity of water rushed in immediately, more than was sufficient to fill the neck. The air being passed through lime water, contracted very sensibly, and precipitated the lime. The residuum, freed in this manner from carbonic acid, extinguished a lighted taper-like water; and this it did repeatedly. He made one of these experiments with more attention than the rest, from which it appeared, that four ounces, one dram, forty grains, by measure, of atmospheric air, lost one-sixth of its original bulk, by being confined five days with one ounce of steeped barley. It is plain, from this experiment, that seeds in the act of vegetation take oxygen from the atmosphere, part of which they retain, and reject the rest charged with carbon. The substance of the seed-lobes is hereby changed, an additional quantity of oxygen being introduced into their composition; and a part of their carbon lost. This change, in the proportion of their alimentary principles, generates sugar, as is evident from the process of malting. But sugar and carbonic acid are more soluble in water than the farinaceous oxyd. They therefore combine with the humidity in the capillary tubes of the seed, and find a ready passage to the germ, the vegetative principle of which they call into action by a stimulus suited to its nature. A nutritious liquor being thus prepared by the decomposition of the seed-lobes, and distributed through the infant plant,

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its organs begin to exert their specific actions, by decomposing the nourishment conveyed to them, and forming new oxyds from the elementary principles of it, for the increase of the vessels and fibres; and in this manner the first stage of vegetation commences.

Mr Gough has ascertained, that a germ in the act of vegetation requires to be continually excited by the stimulus of oxygen; but that as soon as the seed lobes are exhausted, the young plant is in a state to derive its nutrition from the ground; and then (and not till then) it finds itself in a situation capable of making future advances, unassisted by the stimulus of respirable air.

The infant sprout at first suffers only a suspension of its energy from the absence of pure air; but if this necessary support be withheld too long, it perishes by the putrefactive fermentation.

The lively green which the stems and leaves of plants receive from the action of light, cannot be imparted to them, provided the energy of the vegetative principle in them be suspended: for after permitting a number of peas to produce both extremities of their sprouts in wet sand covered from the light by an earthen pot, Mr Gough placed five of them, on the 29th of April, in an inverted glass jar, containing azot confined by water; and three in another jar, in which a portion of common air was also inclosed by the same means. On the 30th the upper extremities of the sprouts of the parcel last mentioned were green; but though the experiment was prolonged to the 2d of May, those in the other glass did not exhibit any perceptible alteration in size or colour. Two of them were now placed in a glass filled with atmospheric air, where they were left unobserved to the 5th, at the end of which time the germs had vegetated considerably; the lower parts of them still remained white, but their opposite extremities had changed to their proper green. Hence it may be safely inferred, that greenness cannot be imparted to the sprouts of seeds without the joint action of light and oxygen; in which they are very different from the shoots that frequently proceed from maturer plants, when secluded from the atmosphere: for, as these grow freely in close glass vessels, placed in a window, and containing water and azot, the parts which are recently produced continue to vegetate, in consequence of their connection with the parent stock, and acquire the colour in question without the assistance of respirable air. See PLANT, TREE, GERMINATION, BOTANY, &c.

VEGETATIVE SOUL, among philosophers, denotes that principle in plants by virtue of which they vegetate, or receive nourishment and grow. See the preceding article.

VEHICLE, in general, denotes any thing that carries or bears another along; but is more particularly used in pharmacy for any liquid serving to dilute some medicine, in order that it may be administered more commodiously to the patient.

VEII (anc. geog.), a city of Etruria, the long and powerful rival of Rome; distant about 100 stadia, or 12 miles, to the north-west; situated on a high and steep rock. Taken after a siege of 10 years by Camillus, six years before the taking of Rome by the Gauls: and thither the Romans, after the burning of their city, had thoughts of removing; but were dissuaded from it by Camillus (Livy). It remained standing after the Punic war; and a colony was there settled, and its territory assigned to the soldiers. But after that it declined so gradually, as not to leave a single trace standing. Famous for the slaughter of the 300 Fabii on the Cremera (Ovid). The spot on which it stood lies near Isola, in St Peter's patrimony (Holstenius).

VEIL, a piece of stuff, serving to cover or hide any thing.

In the Romish churches, in time of Lent, they have veils or curtains over the altar, crucifix, images of saints, &c.

A veil of crape is wore on the head by nuns, as a badge of their profession: the novices wear white veils, but those who have made the vows black ones. See the article NUN.

VEIN, in anatomy, is a vessel which carries the blood from the several parts of the body to the heart. See ANATOMY, n° 123.

VEIN, among miners, is that space which is bounded with woughs, and contains ore, spar, canck, clay, chirt, croil, brownhen, pitcher-chirt, cur, which the philosophers call the *mother of metals*, and sometimes *soil of all colours*. When it bears ore, it is called a *quick vein*; when no ore, a *dead vein*.

VELA, a remarkable cape on the coast of Terra Firma, in South America. W. Long. 71. 25. N. Lat. 12. 30.

VELARIUS, in antiquity, an officer in the court of the Roman emperors, being a kind of usher, whose post was behind the curtain in the prince's apartment, as that of the chancellor's was at the entry of the ballustrade; and that of the ostiarii at the door. The *velarii* had a superior of the same denomination, who commanded them.

VELEZ-DE-GOMARA, a town of Africa, in the kingdom of Fez, and in the province of Eriff. It is the ancient ACARTH. With a harbour and a handsome castle, where the governor resides. It is seated between two high mountains, on the coast of the Mediterranean Sea. W. Long. 4. 0. N. Lat. 35. 10.

VELITES, in the Roman army, a kind of ancient soldiery, who were armed lightly with a javelin, a cask, cuirass, and shield.

VELLEIUS PATERCULUS. See PATERCULUS.

VELLUM, is a kind of parchment, that is finer, evenner, and more white than the common parchment. The word is formed from the French *velin*, of the Latin *vitulinus*, "belonging to a calf."

VELOCITY, in mechanics, swiftness; that affection of motion whereby a moveable is disposed to run over a certain space in a certain time. It is also called *celerity*, and is always proportional to the space moved. Huyghens, Leibnitz, Bernoulli, Wolfius, and the foreign mathematicians, hold, that the momenta or forces of falling bodies, at the end of their falls, are as the squares of their velocities into the quantity of matter; the English mathematicians, on the contrary, maintain them to be as the velocities themselves into the quantity of matter. See QUANTITY, n° 11 and 14, &c.

VELVET, a rich kind of stuff, all silk, covered on the outside with a close, short, fine, soft shag, the other side being a very strong close tissue.

The nap or shag, called also the *velveting*, of this stuff, is formed of part of the threads of the warp, which the workman puts on a long narrow-channelled ruler or needle, which he afterwards cuts, by drawing a sharp steel tool along the channel of the needle to the ends of the warp. The principal and best manufactories of velvet are in France and Italy, particularly in Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, set up by the French refugees; whereof that at Haerlem is the most considerable: but they all come short of the beauty of those in France, and accordingly are sold for 10 or 15 per cent. less. There are even some brought from China; but they are the worst of all.

VENAL, or VENOUS, in anatomy, something that bears

Veil
||
Venal.

Veneering a relation to the veins. This word is also used for something bought with money, or procured by bribes.

Veneering
||
Venice.

VENEERING, **VANEERING**, or *Fineering*, a kind of marquetry, or inlaying, whereby several thin slices or leaves of fine wood, of different kinds, are applied and fastened on a ground of some common wood.

There are two kinds of inlaying: the one, which is the more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, and represents flowers, birds, and the like figures. The first kind is what we properly call *veneering*; the latter we have already described under **MARQUETRY**.

The wood intended for veneering is first sawed out into slices or leaves, about a line thick: in order to saw them, the blocks or planks are placed upright in a kind of vice or sawing-press: the description of which may be seen under the article just referred to. These slices are afterwards cut into slips, and fashioned divers ways, according to the design proposed; then the joints being carefully adjusted, and the pieces brought down to their proper thickness, with several planes for the purpose, they are glued down on a ground or block of dry wood, with good strong English glue. The pieces thus joined and glued, the work, if small, is put in a press; if large, it is laid on the bench, covered with a board, and pressed down with poles, or pieces of wood, one end whereof reaches to the ceiling of the room, and the other bears on the boards. When the glue is quite dry they take it out of the press and finish it; first with little planes, then with divers scrapers, some whereof resemble rasps, which take off dents, &c. left by the planes. When sufficiently scraped, the work is polished with the skin of a sea-dog, wax, and a brush and polisher of shave-grass: which is the last operation.

VENEREAL, something belonging to venery; as the lues venerea, &c. See **MEDICINE** Index.

VENERY, is used for the act of copulation, or coition, of the two sexes.

VENESECTIO, or **PHLEBOTOMY**, in surgery. See **SURGERY**, n°

VENETIAN BOLE, a fine red earth used in painting, and called in the colour shops *Venetian red*.—It is dug in Carinthia, and sent from Venice to all parts of the world; but the use of it here is very much superseded by a bright colcothar of vitriol.

VENICE, a celebrated city of Italy, and capital of a republic of the same name, situated on the Lagunes or Small Islands, about five miles from the continent; in E. Long. 130. N. Lat. 45. 40.

1 Derivation of the name. The name of Venice is evidently derived from *Venetia*, one of the Roman provinces of Italy; and this again from the *Henetians*, a people of Paphlagonia, who settled in that part of the country. The city is said to have been founded about the year 451 or 452; when Attila, having destroyed the cities of Aquileia, Verona, Mantua, Trevigio, &c. such of the inhabitants as escaped the slaughter fled to the islands on their coast, and there took up their residence. Historians are profuse in their commendations of the virtue of the Venetians during the infancy of their city; and Cassiodorus informs us, that one would have taken the inhabitants rather for an assembly of philosophers, living at their ease and cultivating the duties of religion, than for what they really were, a distressed and confused rabble who had escaped from the calamities of war. Nothing remarkable, however, occurs in the history of Venice for some time, excepting the change of government from the consular to the tribunitial form, which happened about 30 years after the building of the city. The republic first began to be of consequence after the destruction of Padua by the Lombards.

2 Excellent character of the first inhabitants.

3 When the republic began to make a figure.

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About this time they were become masters of a fleet and a body of land-forces. They engaged in a quarrel with the Lombards, of which we know not the particulars. In a short time, however, they distinguished themselves against the Istrian pirates, who had committed depredations on their coasts, and the Tergestines, or inhabitants of Trieste, who had suddenly carried off a number of the citizens of Venice. These exploits procured them a considerable degree of reputation and esteem among their neighbours; and by improving every opportunity of increasing their trade, and augmenting the number of manufactures, &c. the city very soon arrived at a high pitch of affluence and power. In the war carried on by Justinian with the Goths in Italy, the Venetians gave considerable assistance to Narses the Roman general, inasmuch that he expressed his gratitude by several rich presents, some high marks of distinction, and particularly by building two fine churches dedicated to the saints Theodore and Germinian; the oldest public buildings, beside St Mark's and St Peter's, in Venice.

From the time of Justinian to the year 697, historians are silent with regard to the Venetian affairs. A great revolution now took place in the government: the tribunes having abused their power were abolished; and in their stead was elected a *doge* or duke, in whom was vested the supreme authority. He was to represent the honour and majesty of the state; to have respect and distinction paid him beyond what the tribunes, or even the consuls, enjoyed: he was to assemble and preside at the great council; to have a casting vote in all disputed points; to nominate to all offices, places, and preferments; and lastly, to enjoy the same authority in the church as in the state. This form of government was changed in 737, for what reason we know not, and a supreme magistrate chosen, with the title of *master of the horse* or *general of the forces*. His power was to continue only for a year, the shortness of its duration being thought a sufficient security against the abuse of it. But in five years afterwards the doges were restored, and Giovanni Fabritio, the fourth and last master of the horse, was deposed, and his eyes put out, but for what fault we know not.

Under the doges, the power and wealth of the Venetian republic continued to increase. In 764 the Heracleans and Jesulans, subjects to the republic, having formed some designs against the state, put themselves under the protection of Charlemagne. That conqueror, not finding it convenient to give them present assistance, settled them in Malamoc until he could give them more effectual succour. The Venetians, however, disregarding the protection of that powerful monarch, attacked and instantly drove them out of the place where he had settled them. Incensed at this, Charlemagne ordered his son Pepin to declare war against the republic. This was immediately done; but the blow was for some time diverted by Astolphus king of the Lombards, who, committing great devastations in the territories of the pope, obliged Pepin to come to the assistance of his holiness. However, after having afforded the necessary succour to the pope, Pepin prosecuted the war with Venice. The event is uncertain: all we know is, that about this time the Venetians declared themselves a free and independent state; which makes it probable that his success had not been great. But in 804 the war was renewed with the utmost fury. Pepin having quarrelled with Nicephorus the Greek emperor, and finding Obelerio the Venetian doge inclined to favour his adversary, determined to exterminate the very name of the republic. After having laid waste the province of Venetia, he led his army directly to Venice, blocking the city up at the same time by his fleet. The Venetians were not disheartened at the number of their ene-

Venice.

4 Assists the Roman general Narses, and honoured by him on that account.

5 First election of a doge or duke.

6 Changes of government.

7 Quarrel with Charlemagne.

8 Pepin declares war against the republic.

9 The Venetians declare themselves independent.

10 The city besieged by Pepin.

¹¹ Venice. The citizens reduced to great straits. The French fleet entirely destroyed.

¹² And great part of their army.

¹³ The siege raised.

¹⁴ The doge torn in pieces by the populace.

¹⁵ The Venetians defeated at sea by the Saracens.

mies, the reputation of Pepin, or the civil divisions among themselves; their animosities were laid aside, and a strict union formed against the common enemy: the chief command was given to Valentin, as Obelerio was supposed too nearly allied to Pepin to fight with that good-will and cheerfulness the service of his country required. The Venetians, notwithstanding the most oblique defence, the most vigorous sallies, and their selling every inch of ground at an incredible expence of blood, were at length reduced to that part of the city south of the Rialto; this stream, and their own bravery, being now their only defence. While Pepin was preparing to lay a bridge over the canal, they resolved, as a last effort, to attack Pepin's fleet, and to vanquish or die in defence of their liberty. Embarking all the troops they could spare, they bore down, with the advantage of the wind and tide, upon the enemy, and began the attack with such fury, as obliged the French admiral to give way. The lightness of their ships, and the knowledge of the soundings, gave the Venetians every advantage they could wish: the enemy's fleet was run aground, and the greater part of their troops perished in attempting to escape; the ships were all, to a few, either taken or destroyed. During this action at sea, Pepin resolved to assault the city by land, not doubting but the garrison was so weakened by the number of forces they had sent on board the fleet, as to be able to make but a slight resistance. Having for this purpose thrown a bridge over the Rialto, he was marching his troops across it, when he found himself attacked on every side by the Venetians from their boats, and others who had posted themselves on the bridge. The battle was long, bloody, and doubtful, until the Venetians employed all their power to break down the bridge; which at last yielding to their obstinate endeavours, a prodigious slaughter of the French ensued: however, they fought like men in despair, seeing no hopes of safety but in victory; but all communication being cut off with the troops on shore, they were to a man either killed or drowned. The number of slain was so great, that the space between the Rialto and Malamoc was covered with dead bodies, and has ever since gone by a name expressive of the prodigious slaughter. Pepin was so struck with the intrepidity of the Venetians, that he raised the siege, abandoned the enterprise, and concluded a peace with the republic: he afterwards came to Venice to intercede for Obelerio, that he might be restored; which the Venetians granted, more out of respect to the request of so great a prince, than love to the unhappy Obelerio. The people had a notion that Obelerio had encouraged Pepin to declare war upon the republic; and that a correspondence between them was carried on during the siege; Pepin was therefore no sooner withdrawn, than the populace seizing upon Obelerio, tore his body in pieces, and scattered his limbs and bowels about the city. His wife shared the same fate; for as she was the sister of Pepin, it was not doubted but her influence was the cause of her husband's perfidy.

In 839 we find the Venetians engaged in an alliance offensive and defensive against the Saracens with Michael the Greek emperor. A fleet of 60 galleys was immediately equipped, who joined the Grecian fleet and engaged the enemy; but during the heat of the engagement, the Greeks having basely deserted their allies, the Venetians were so completely defeated, that scarce a single vessel remained to carry the news of their misfortune to Venice. This defeat threw the city into the utmost consternation, as it was not doubted that the Saracens would immediately lay siege to the capital; but from these fears they were soon relieved, by certain intelligence that the Saracens had gone to Ancona, which they had pillaged and destroyed. The Narentines, however, a piratical people, no sooner heard of the defeat

of the Venetians, than they laid waste the coasts of Dalmatia, and ravaged the country for a considerable way; at the same time that the city was distracted by internal dissensions and tumults, in one of which the doge was murdered.

It was not till the year 881 that the Venetian affairs were thoroughly re-established. By the prudent and vigorous administration of Orso Participato the power of the Saracens was checked, the Narentines utterly defeated, and peace and domestic tranquillity restored. From this time the republic continued to flourish; and in 903 her reputation for arms became famous all over the world by a great victory gained over the Hungarians, who had invaded Italy, defeated Berengarius, and threatened the country with total destruction. For a long time after, we meet with no remarkable transactions in the Venetian history; but in general the republic increased in wealth and power by its indefatigable application to maritime affairs and to commerce. About the year 1040 it was ordained that no prince should associate a colleague with him in the supreme power, a statute which has ever since continued unaltered.

Towards the close of the 11th century, Venice began to make a very considerable figure among the Italian states, and to carry on wars with several of them. In 1084 the republic was by the emperor of Constantinople invested with the sovereignty of Dalmatia and Croatia, which, however, had been held long before by right of conquest. As soon as the Crusade was preached up, the Venetians fitted out a fleet of 200 sail against the infidels; but before this armament was in a condition to put to sea, war broke out with Pisa. The doge Vitalis Michael took upon him the command of the fleet, when, after having defeated the Pisans in a bloody action at sea, he set sail for Smyrna, and from thence to Ascalon, at that time besieged by the Christians. To his valour was owing the conquest of this city, as well as those of Caipha and Tiberias; but before he had time to push his good fortune further, he was recalled on account of an invasion of the Normans of Dalmatia. Here he was equally successful: the Normans were everywhere defeated; and Michael returned home loaded with booty; but died soon after, to the great grief of all his subjects. He was succeeded by Ordolpho Faliero, under whom the Venetians assisted Baldwin in the siege of Ptolemais, and are said to have been the chief instruments of its conquest; and Baldwin, in recompense for the services of the republic, invested her with the sovereignty of that city, which he endowed with many extraordinary privileges, in order to render his present more valuable. This good fortune, however, was overbalanced by a rebellion in Dalmatia and Croatia. The former was reduced; but, in a battle with the Croats, the doge was killed, and his army entirely defeated: by which disaster the Venetians were so much dispirited, that they clapped up a peace on the best terms they could, giving up all thoughts of Croatia for the present.

Under the government of Domenico Micheli, who succeeded Ordolpho, the pope's nuncio arrived at Venice, and excited such a spirit of enthusiasm among all ranks and degrees of men, that they strove whose names should be first enrolled for the holy war. The doge, having fitted out a fleet of 60 galleys, sailed with it to Joppa, which place the Saracens were at that time besieging. The garrison was reduced to the last extremity when the Venetian fleet arrived, surprised, and defeated that of the enemy with great slaughter; soon after which the Saracens raised the siege with precipitation. Tyre was next besieged, and soon was obliged to capitulate; on which occasion, as well as on the taking of Ascalon, the Venetians shared two-thirds of the spoils. But in the mean time the emperor of Constantinople, jealous of the increasing power and wealth of the republic,

25 Venice: republic, resolved to make an attack upon Venice, now weakened by the absence of the doge and such a powerful fleet. But the senate, having timely notice of the emperor's intentions, recalled the doge, who instantly obeyed the summons. Stopping at Rhodes, in his way home to refresh and water the fleet, the inhabitants refused to furnish him with the necessaries he demanded. Incensed at this denial, he levelled their city with the ground; and from thence sailing to Chios, he laid waste and destroyed the country, carrying off the body of St Isidore, in those days accounted an inestimable treasure. After this he seized on the islands of Samos, Lesbos, Andros, and all those in the Archipelago belonging to the emperor; and having reduced Zara, Spolatra, and Trahu, places in Dalmatia which had revolted during his absence, he returned in triumph to Venice, where he was received with great joy.

26 Quarrel with the emperor Barbarossa. The Venetians now became very formidable throughout all Europe. The Sicilians, Paduans, with the states of Verona and Ferrara, felt the weight of their power; and in 1173 they ventured to oppose Frederic Barbarossa emperor of Germany. The occasion of this quarrel was, that pope Alexander had taken shelter in Venice in order to avoid the resentment of Barbarossa, who had conceived an implacable aversion against him. The Venetians dispatched ambassadors to him; but he answered them in a rage, "Go tell your prince and people, that Frederic the Roman emperor demands his enemy, who is protected by them. If they send him not instantly bound hand and foot, he will overturn every law, human and divine, to accomplish his revenge; he will bring his army before their city, and fix his victorious standards in the market-place, which shall float in the blood of its citizens." On the return of the ambassadors with this terrible menace, it was agreed to equip a fleet with all expedition, and prepare for repelling the attacks of such a formidable and haughty enemy. But before the armament could be prepared, Otho, the emperor's son, arrived before the city with a fleet of 75 galleys. The doge Sebastiano Ziani sailed out with the few vessels he had got equipped, to give the enemy battle. The fleets met off the coast of Istria, and a terrible engagement ensued, in which the imperial fleet was totally defeated, Otho himself taken prisoner, and 48 of his ships destroyed. On the doge's return, the pope went out to meet him, and presented him with a ring, saying, "Take this, Ziani, and give it to the sea, as a testimony of your dominion over it. Let your successors annually perform the same ceremony, that posterity may know that your valour has purchased this prerogative, and subjected this element to you, even as a husband subjecteth his wife." Otho was treated with the respect due to his rank; and soon conceived a great friendship for Ziani. At last, being permitted to visit the imperial court on his parole, he not only prevailed on his father to make peace with the Venetians, but even to visit their city, so famed for its commerce and naval power. He was received with all possible respect, and on his departure attended to Ancona by the doge, the senate, and the whole body of the nobility. During this journey he was reconciled to the pope; and both agreed to pay the highest honours to the doge and republic.

28 His son Otho defeated and taken prisoner by the Venetians. Institution of the custom of marrying the sea. 29 Peace concluded with the emperor. In the beginning of the 13th century, the Venetians, now become exceedingly powerful and opulent, by reason of the commerce which they carried on with the richest countries of the world, were invited by young Alexis, son to the emperor of Constantinople, to his father's assistance, who had been deposed by a rebellious faction. In conjunction with the French, they undertook to restore him; and easily succeeded. But the old emperor dying soon after, his son was elected in his room, and a few days after murdered by his own subjects; on which the empire was seized by Myrtilus, a man of mean birth, who had been raised by the favour of old Alexis. As the allied army of French and Venetians was encamped without the city, Myrtilus resolved immediately to drive them out of his dominions, and for this purpose attempted to surprise their camp; but being repulsed, he shut himself up in the city, with a resolution to stand a siege. The allies assaulted it with so much vigour, that the usurper was obliged to fly; and though the citizens held out after his departure, they were obliged in less than three months to capitulate. This proved a source of greater acquisition to Venice than all that had yet happened. All the chief offices of the city were filled up with Venetians, in recompense for their services: the allies entered Thrace, and subdued it; Candia, and all the Greek islands, also fell under the dominion of the republic.

31 Venetians invited to the assistance of the emperor of Constantinople. In the mean time the Genoese, by their successful application to commerce, having raised themselves in such a manner as to be capable of rivalling the Venetians, a long series of wars took place between the republics; in which the Venetians generally had the advantage, though sometimes they met with terrible overthrows. These expensive and bloody quarrels undoubtedly weakened the republic in the main, notwithstanding its successes. In the year 1348, however, the Genoese were obliged to implore the protection of Visconti duke of Milan, in order to support them against their implacable enemies the Venetians. Soon after this, in the year 1352, the latter were utterly defeated, with such loss, that it was thought the city itself must have fallen into the hands of the Genoese, had they known how to improve their victory. This was in a short time followed by a peace; but from this time the power of the republic began to decline. Continual wars with the states of Italy, with the Hungarians, and their own rebellious subjects, kept the Venetians employed so that they had no leisure to oppose the Turks, whose rapid advances ought to have alarmed all Europe. After the destruction of the eastern empire, the Turks came more immediately to interfere with the republic. The consequences are related under the article TURKEY. Whatever valour might be shown by the Venetians, or whatever successes they might boast of, it is certain that the Turks ultimately prevailed; so that for some time it seemed scarce possible to resist them. What contributed also greatly to the decline of the republic, was the discovery of a passage to the East Indies by the Cape of Good Hope in 1497. To this time the greatest part of the East India goods imported into Europe passed through the hands of the Venetians; but as soon as the above-mentioned discovery took place, the carriage by the way of Alexandria almost entirely ceased. Still, however, the Venetian power was strong; and in the beginning of the 16th century they maintained a war against almost the whole power of France, Germany, and Italy; but soon after we find them entering into an alliance with some Italian states and the king of France against the emperor. These wars, however, produced no consequences of any great moment; and in 1573 tranquillity was restored by the conclusion of a peace with the Turks. Nothing of consequence happened in the affairs of the Venetian republic till the year 1645, when the Turks made a sudden and unexpected descent on the island of Candia. The senate of Venice did not display their usual vigilance on this occasion. They had seen the immense warlike preparations going forward, and yet allowed themselves to be amused by the grand seignior's declaring war against Malta, and pretending that the armament was intended against that island. The troops landed without opposition; and the town of Canéa was taken, a terrible obstinate defence.

32 The city taken by the French and Venetians. Wars between Venice and Genoa. 33 Causes of the decline of the Venetian power. 34 The Genoese put themselves under the protection of the duke of Milan. 35

This

³⁷ Venice. This news being brought to Venice, excited an universal indignation against the Turks; and the senate resolved to defend to the utmost this valuable part of the empire. Extraordinary ways and means of raising money were fallen upon: among others, it was proposed to sell the rank of nobility. Four citizens offered 100,000 ducats each for this honour; and, notwithstanding some opposition, this measure was at last carried. Eighty families were admitted into the grand council, and to the honour and privileges of the nobility. What an idea does this give of the wealth of the inhabitants of Venice?

³⁸ Remarkable siege of the capital of Candia. The siege of Candia, the capital of the island of that name, is, in some respects, more memorable than that of any town which history, or even which poetry, has recorded. It lasted 24 years. The amazing efforts made by the republic of Venice astonished all Europe; their courage interested the gallant spirits of every nation: volunteers from every country came to Candia to exercise their valour, to acquire knowledge in the military art, and assist a brave people whom they admired.

³⁹ Desperate valour of the Venetians. During this famous siege, the Venetians gained many important victories over the Turkish fleet. Sometimes they were driven from the walls of Candia, and the Turkish garrison of Canéa was even besieged by the Venetian fleets. Great slaughter was made of the Turkish armies; but new armies were soon found to supply their place, by a government which boasts such populous dominions, and which has despotic authority over its subjects.

⁴⁰ Cruelty of the Turkish sultan. Mahomet the fourth, impatient at the length of this siege, came to Negropont, that he might have more frequent opportunities of hearing from the vizir, who carried on the siege. An officer, sent with dispatches, was directed by the vizir to explain to Mahomet the manner in which he made his approaches, and to assure him that he would take all possible care to save the lives of the soldiers. The humane emperor answered, That he had sent the vizir to take the place, and not to spare the lives of the soldiers; and he was on the point of ordering the head of the officer who brought this message to be cut off, merely to quicken the vizir in his operations, and to show him how little he valued the lives of men.

⁴¹ The city capitulates. In spite of the vizir's boasted parsimony, this war is said to have cost the lives of 200,000 Turks. Candia capitulated in the year 1668. The conditions on this occasion were honourably fulfilled. Morfini, the Venetian general, marched out of the rubbish of this well-disputed city with the honours of war. — The expence of such a tedious war greatly exhausted the resources of Venice, which could not now repair them so quickly as formerly, when she enjoyed the rich monopoly of the Asiatic trade.

⁴² New war with the Turks. This republic remained in a state of tranquillity, endeavouring, by the arts of peace and cultivation of that share of commerce which she still retained, to fill her empty exchequer, till she was drawn into a new war, in the year 1683, by the insolence of the Ottoman court. The Venetians had for some time endeavoured, by negociation and many conciliatory representations, to accommodate matters with the Turks; and though the haughty conduct of their enemies afforded small hopes of success, yet such was their aversion to war on the present occasion, that they still balanced, whether to bear those insults or repel them by arms; when they were brought to decision by an event which gave the greatest joy to Venice, and astonished all Europe. This was the great victory gained over the Turkish army before the walls of Vienna by Sobieski king of Poland.

In this new war, their late General Morfini again had the command of the fleets and armies of the republic, and sustained the great reputation he had acquired in Candia. He con-

quered the Morea, which was ceded formally to Venice, with some other acquisition, at the peace of Carlowitz, in the last year of the last century.

⁴³ Venice. The Morea conquered by the Venetians. During the war of the succession, the state of Venice observed a strict neutrality. They considered that dispute as by the Venetians. unconnected with their interests, taking care, however, to keep on foot an army on their frontiers in Italy, of sufficient force to make them respected by the contending powers. But, soon after the peace of Utrecht, the Venetians were again attacked by their old enemies the Turks; who, beholding the great European powers exhausted by their late efforts, and unable to assist the republic, thought this the favourable moment for recovering the Morea, which had been so lately ravished from them. The Turks obtained their object; and at the peace of Passarowitz, which terminated this unsuccessful war, the Venetian state yielded up the Morea; the grand seignior, on his part, restoring to them the small islands of Cerigo and Cerigotto, with some places which his troops had taken during the course of the war in Dalmatia. Those, with the islands of Corfou, Santa Maura, Zante, and Cephalonia, the remains of their dominions in the Levant, they have since fortified at a great expence, as their only barriers against the Turks.

⁴⁴ They are obliged to relinquish it again. Since this period no essential alteration has taken place in the Venetian government, nor has there been any essential increase or diminution in the extent of their dominions. They have little to fear at present from the Turks, whose attention is sufficiently occupied by a more formidable enemy than the republic and the House of Austria united. Besides, if the Turks were more disengaged, as they have now stripped the republic of Cyprus, Candia, and their possessions in Greece, what remains in the Levant is hardly worth their attention.

The declension of Venice did not, like that of Rome, proceed from the increase of luxury, or the revolt of their own armies in the distant colonies, or from civil wars of any kind. Venice has dwindled in power and importance from causes which could not be foreseen, or guarded against by human prudence although they had been foreseen. In their present situation, there is little probability of their attempting new conquests; happy if they are allowed to remain in the quiet possession of what they have.

⁴⁵ State of Venice since that time. We have already mentioned the situation of Venice, the capital of this republic. Its appearance at a distance is very striking, looking like a great town half floated by a deluge. Between the city and the Terra Firma are a great many shallows, on which at low water you may almost every where touch the bottom with a pole; but all possible care is taken to prevent their becoming dry land. On the south side of the city are also shallows; but on these there is a greater depth of water. The channels between them are marked out by stakes or poles, which on the approach of an enemy would certainly be taken away. The city is divided by a vast number of canals, on which ply the gondoliers, or watermen, in their black gondolas or boats. The streets are very clean and neat, but narrow and crooked. There are no carriages, not so much as a chair, to be seen in them. Though the city, by its situation and the great number of steeples towering above the water, strikes one with admiration at a distance, yet when he is got into it, it does not answer his expectation; for excepting the square of St Mark and a few other places, there is nothing grand or beautiful in it, at least in comparison of many other cities of Italy. Of the canals, that called *Il Canale Maggiore*, or the "great canal," is by far the largest and longest, and consequently the most beautiful. Here races are sometimes run for prizes in the gondolas. On its banks are also several stately houses. Over these canals are a great number of handsome bridges of

Venice.

of one arch, but without any fence on either side: they are also built of white stone, with which the streets are all paved, except the Rialto over the great canal, which is all of marble, and cost the republic 250,000 ducats, the arch being 90 feet wide. The canals in summer emit a bad smell, from the great quantities of filth continually running into them. The finest gondolas are those in which the foreign ministers make their public entries, being richly decorated with gilding, painting, and sculpture. The number of islands on which the city stands, according to some, is 60; according to others, 72. The circumference is about six Italian miles; and it takes up about two hours to make the circuit of it in a gondola. The inhabitants are supposed to be about 150,000 including those of the islands Murano, La Guidecca, and those who live on board the barges. There are near 200 springs of fresh water in the city; but the water of many of them is so indifferent, that the principal families preserve rain-water in cisterns, or are supplied with water from the Brenta. The most remarkable places in the city are the ducal palace, the square and church of St Mark, who is the tutelar saint of Venice; the mint, public library, grand arsenal, several of the palaces of the nobles, churches, convents, and hospitals. In these last is a prodigious collection of the finest paintings; Venice, in this respect, even surpassing Rome itself. The diversions of the Venetians are chiefly masquerading, especially during the carnival and other festivals; *ridottos*, operas, plays, which are generally wretched performances, and concerts of vocal and instrumental music. During their festivals, debauchery, riot, and licentiousness, are carried to the greatest height. The courtezans here, we are told, are absolutely lost to all sense of modesty and common decency. The grand scene of all, the shows and follies of the festivals, is the square of St Mark, in which bulls are sometimes baited. In the doge's palace all the high colleges hold their assemblies; but we are told by several travellers, which seems very strange, that the stairs are no better than a privy. In this palace is a small arsenal, furnished with arms against any sudden insurrection of the people, together with a state prison, a great many exquisite paintings, and several curiosities, among which are some *claustra castitatis*. One side of it is towards St Mark's square, and the lower gallery on that side, with the hall under the new procuratie facing it, are called the *Broglia*, where the nobility and none else, at least while they are present, are allowed to walk. The square of St Mark is the greatest ornament of the city, and hath the form of a parallelogram. In this square, besides the church and palace of St Mark, are two towers, on one side of which is a curious clock; and the other has stairs so constructed that one may ride up on horseback. Opposite to the ducal palace is the public library of the commonwealth; containing a large collection of books and manuscripts, with some fine paintings, statues, and curiosities. Hard by St Mark's square is the zecca, or mint: from zecca the gold coin called *zecchino* takes its name. One of the smallest pieces of money at Venice is called *gazetta*; and the first newspapers published there, on a single leaf, having been sold for that a-piece, all kinds of newspapers were from thence styled *gazettes*. The grand arsenal is two and a half Italian miles in circuit, and contains vast quantities of naval and other warlike stores: some pretend that it could furnish arms for 10,000 horse and 100,000 foot: here are the trophies of Scanderbeg and others, with the helmet of Attila, &c. The rope walk is 444 common paces in length, and the ropes and cables are valued at 2,000,000 of silver ducats. In the foundery none but brass cannon are cast; and 100 men are generally at work in the forges. The salt-petre works here deserve a traveller's notice: there is a vessel filled with wine and water four times a-day, where the workmen,

though 1000 or more, may drink as much and as often as they please. Close to the Rialto is the bank. The trade of the city at present is far short of what it was formerly. Their chief manufactures are cloth; especially scarlet, silks, gold and silver stuffs, brocades, velvets, and paper, of which, and wine, oil, fruit, sweetmeats, anchovies, and several sorts of drugs used in physic and painting, the exports are still considerable. Venice has neither walls, gates, nor citadel, to defend it; its situation supplying the want of all these. In the treasury of relics is the protocoll, or original manuscript, as they pretend, of St Mark's gospel: it is rarely shown; and the writing, by length of time, is so defaced, that the greatest connoisseurs in manuscripts cannot determine whether it was wrote in Greek or Latin. Besides what is properly called the city, there is a multitude of little islands lying round, which are covered with buildings, and make each of them a kind of separate town; the most considerable of which is that called *Guidecca*, or the "Jews Quarter," which is large and populous; with St Erolmo, St Helena, St Georgio, Chiofa, Il Lido de Palestrina, Il Lido de Malamocco, and Murano: these islands are a sort of fence to the city, breaking the violence of the waves. To distinguish them from others, the Jews here must wear a bit of red cloth in their hats. The gardens in this city are few and inconsiderable. In the island of Murano are made those beautiful looking-glasses, and other glass-works, for which Venice is so much noted: here the family of Cornaro hath a palace, with a gallery of paintings, little short of an Italian mile in length. The salt-works in the island of Chiofa are of great benefit to the Venetians, and yield a very considerable revenue. There are several other small islands about Venice besides those we have mentioned; but they are inconsiderable.

As to the government of this state, it was, as above related, at first vested in consuls, afterwards in tribunes. About the beginning of the 8th century, a doge or duke was elected, and vested with unlimited power; but in 1171, the power of the doge was much abridged, and a council of 240 persons, composed of commons as well as nobles, was appointed. Soon after, under duke Marino Morosini, the present form of electing the doge was introduced. In 1296, the government became aristocratical; the privilege of sitting in the great council being then confined to the nobility, in whom alone the supreme authority at present is vested. The number of nobles amounts to about 200. All those are members of the senate; but, according to their antiquity, some are accounted more honourable than others. One class, and that the lowest, consists of the posterity of those who, in the necessitous times of the commonwealth, purchased their nobility for 100,000 ducats. The nobles have the title of *Excellency*; and wear, at least when in the city, a black furred gown reaching to their heels, with long caps and periwigs. Some of them are so poor, that they are fain to beg of the rich. At the head of the government is the doge, whose office was once hereditary and power absolute; but the former is now elective, and the latter very much circumscribed: indeed he is no more than a gaudy slave, loaded with fetters, which one would think could not be much the lighter for being gilt; yet so much is the human heart captivated with external pomp and pageantry, that the office, for the most part, is eagerly sought after: but should one otherwise inclined be chosen, he cannot decline it, without exposing himself to banishment and confiscation of his effects. Though the power of the doge is very small, his state and retinue are very splendid: his title is that of *Serenity*, and his office for life: he is said to be a king with regard to his robes, a senator in the council-house, a prisoner in the city, and a private man out of it. The yearly revenue of his office is about 4000 l.

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4000 l.; and though he may be deposed, he cannot resign his dignity. All the nobility have a seat in the great council, unless they are under 25 years of age. In this council the supreme authority and legislative power is vested. Next to it is the senate or *pregradi*, which consists of about 250 members, who have the power of making peace or war, and foreign alliances; of appointing ambassadors; fixing the standard of the coins; imposing duties and taxes; and all offices by sea and land are in their gift. The third council consists of the doge and his six counsellors, in which all letters and instruments relating to the state are read, ambassadors admitted to audience, and other important affairs transacted. The other colleges are the council of ten; which decides all criminal cases without appeal, and to which even the doge himself is subject: the procurators of St Mark, whose office is very lucrative, and who decide with respect to wills, guardianships, and the making a proper provision for the poor; and the state-inquisition, whose business it is to provide for the public tranquillity. In the wall of the ducal palace are heads of lions and leopards, with open mouths, to receive informations of any plot or treason against the state. Here is also a particular college for the regulation of dress, but their jurisdiction does not extend to strangers. The method of electing the doge is no less singular than complicated, and effectually calculated to prevent all kinds of bribery or corruption. All the members of the grand council who are past 30 years of age, being assembled in the hall of the palace, as many balls are put into an urn as there are members present; 30 of these balls are gilt, and the rest white. Each counsellor draws one; and those who get the gilt balls go into another room, where there is an urn containing 30 balls, nine of which are gilt. The 30 members draw again; and those who by a second piece of good fortune get the gilt balls are the first electors, and have a right to choose 40, among whom they comprehend themselves.

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Method of
choosing
the doge.

These 40, by balloting in the same manner as in the former instances, are reduced to 12 second electors, who choose 25; the first of the 12 naming three, and the remaining 11 two a-piece. All those being assembled in a chamber apart, each of them draws a ball from an urn containing 25 balls, among which are 9 gilt. This reduces them to 9 third electors, each of whom chooses five, making in all 45; who, as in the preceding instances, are reduced by ballot to 11 fourth electors, and they have the nomination of 41, who are the direct electors of the doge. Being shut up by themselves, they begin by choosing three chiefs and two secretaries; each elector being then called, throws a little billet into an urn which stands on a table before the chiefs. On this billet is inscribed the person's name whom the elector wishes to be doge.

The secretaries then, in the presence of the chiefs and of the whole assembly, open the billets. Among all the 41 there are generally but a very few different names; as the election for the most part balances between two or three candidates. Their names, whatever is the number, are put into another urn, and drawn out one after another. As soon as a name is extracted the secretary reads it, and if the person to whom it belongs is present, he immediately retires. One of the chiefs then demands with a loud voice, whether any crime can be laid to this person's charge, or any objection made to his being raised to the sovereign dignity? If any objection is made, the accused is called in and heard in his own defence; after which the electors proceed to give their decision, by throwing a ball into one of the two boxes, one of which is for the Ayes, the other for the Noes. The secretaries then count the balls; and if there are 25 in the first, the election is finished; if not, another name is read,

and the same inquisition made as before, till there are 25 appearing balls.

The principal Venetian order of knighthood is that of St Mark; the badge of which is a large gold medal dependent on the breast. The order of Constantine knights wear a cross hanging from a gold chain.

With respect to religion, that of the Venetians is the Roman Catholic; but they are no bigots. The court of inquisition is here under very great restrictions; and the pope is considered as little more than a temporal prince, his supremacy being rejected.

The Venetians are still the greatest naval power in Italy. They pretend they could fit out, in case of necessity, 60 men of war, 100 galleys, and 10 galleasses; though one can hardly imagine how they could man half that number. The army is said to consist of between 20,000 and 30,000 men; the greatest part of which are Dalmatians and Switzers. The commander in chief, styled *Capitano*, is always a foreigner of distinction. General Graeme, a Scotchman, lately enjoyed that honourable post. The ordinary revenues of the state are computed at about 1,200,000 l. sterling; but in time of war they can raise them greatly. A considerable part of the revenue arises from the customs, and the duty on salt made at Corfu and Chiofa.

The Venetians are in general tall and well made. They are a lively ingenious people, extravagantly fond of public amusements, with an uncommon relish for humour, and yet more attached to the real enjoyments of life than to those which depend on ostentation and proceed from vanity. The women are of an easy address, and have no aversion to cultivating an acquaintance with those strangers who are presented to them by their relations, or have been properly recommended.

VENIRE FACIAS, in law, is a judicial writ lying where two parties plead and come to issue, directed to the sheriff, to cause 12 men of the same neighbourhood to meet and try the same, and to say the truth upon the issue taken.

VENTER, signifies the belly; but it is also used for the children by a woman of one marriage: there is in law a first and second venter, &c. where a man hath children by several wives; and how they shall take in descents of lands.

VENTER *Inspiciendo*, is a writ to search a woman that saith she is with child, and thereby withholdeth lands from the next heir: the trial whereof is by a jury of women.

VENTILATOR, a machine by which the noxious air of any close place, as an hospital, gaol, ship, chamber, &c. may be discharged and changed for fresh.

The noxious qualities of bad air have been long known; and no one has taken greater pains to set the mischief arising from foul air in a just light than Dr Hales; who has also proposed an easy and effectual remedy by the use of his ventilators; his account of which was read to the Royal Society in May 1741. In the November following M. Triewald, military architect to the king of Sweden, informed Dr Mortimer secretary to the Royal Society, that he had in the preceding spring invented a machine for the use of his majesty's men of war, in order to draw out the bad air from under their decks, the least of which exhausted 36,172 cubic feet of air in an hour, or at the rate of 21,732 tons in 24 hours. In 1742 he sent one of them, formed for a 60 gun ship to France; which was approved of by the Royal Academy of Sciences at Paris; and the king of France ordered all the men of war to be furnished with the like ventilators.

The ventilators invented by Dr Hales consist of a square box ABCD (fig. 1.) of any size; in the middle of one side of this box a broad partition or midriff is fixed by hinges X, and it moves up and down from A to C, by means of an

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Order of
knighthood.

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force and

revenues.

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Character.

Plate
DAIL

Ventilator. an iron rod ZR, fixed at a proper distance from the other end of the midriff, and passing through a small hole in the cover of the box up to R. Two boxes of this kind may be employed at once, and the two iron rods may be fixed to a lever FG (fig. 2.) moving on a fixed centre O; so that by the alternate raising and pressing down of the lever FG, the midriffs are also alternately raised and depressed, whereby these double bellows are at the same time both drawing in air, and pouring it out, through apertures with valves made on the same side with, and placed both above and below, the hinges of the midriffs. In order to render the midriffs light, they are made of four bars lengthwise, and as many across them breadthwise, the vacant spaces being filled up with thin pannels of fir-board; and that they may move to and fro with the greater ease, and without touching the sides of the boxes, there is an iron regulator fixed upright to the middle of the end of the box AC (fig. 1.) from N to L, with a notch cut into the middle of the end of the midriff at Z; so that the midriffs, in rising and falling, suffer no other friction than what is made between the regulator and the notch. Moreover, as the midriff ZX moves with its edges only one twentieth of an inch from the sides of the box ABCDFE, very little air will escape by the edges; and, therefore, there will be no need of leathern sides as in the common bellows. The end of the box at AC is made a little circular, that it may be better adapted between A and C to the rising and falling midriff; and at the other end X of the midriff a slip of leather may be nailed over the joints if need'ul. The eight large valves through which the air is to pass, are placed at the hinge-end of the boxes BK (fig. 2.) as at 1, 2, 3, &c. The valve 1 opens inward to admit the air to enter, when the midriff is depressed at the other end by means of the lever FG. And at the same time the valve 3 in the lower ventilator is shut by the compressed air which passes out at the valve 4. But when that midriff is raised, the valve 1 shuts, and the air passes out at the valve 2. And it is the same with the valves 5, 6, &c. of the other box; so that the midriffs are alternately rising and falling, and two of the ventilators drawing in air, and two blowing it out; the air entering at the valves 1, 3, 6, 8, and passing out at the valves 2, 4, 5, 7. Before these last valves there is fixed to the ventilators a box QQNM (fig. 3.) as a common receptacle for all the air which comes out of these valves; which air passes off by the trunk P, through the wall of a building.

For a farther account of this machine we refer to the author himself, who gives a full detail of it and of its manner of working. See Description of Ventilators by Stephen Hales, D. D. Lond. 1743, 8vo.

The ventilators in large ships, since the order for ventilating the fleet issued by the lords of the admiralty in 1756, are fixed in the gunner's fore-store-room, and generally ahead of the sail-room. The foul air is carried up through the decks and fore-castle near the fore-mast, sometimes afore it, and sometimes abaft it, but more frequently on its star-board side; the lever, by which the ventilators are worked, is under the fore-castle in two deck ships, and between the upper and middle decks in three-deckers; sometimes the lever is hung athwart ships; in some ships afore and aft, and in others oblique. The iron rod, which communicates the motion from the lever, passes through the partners of the fore-mast, and is connected with another lever, suspended at or near the middle; in some ships over the ventilators, in others under them, when it is found necessary to fix them up to the deck. The best method to save room is to place the ventilators over one another with their circular ends together; the air-trunk should be so high above deck, that the men on deck may not be incommoded by the foul air which

blows out of it; and therefore the trunk comes through the upper deck, near and behind the fore-mast. For the method of freeing mines, ships, prisons, &c from noxious air by means of fire-pipes, see PNEUMATICS, n° 371.

VENTRICLE, properly denotes any little cavity; but is more particularly used by physicians and anatomists for the stomach and certain cavities of the heart and brain.

VENTRILLOQUISM, an art by which certain persons can so modify their voice, as to make it appear to the audience to proceed from any distance, and in any direction. Some faint traces of this art are to be found in the writings of the ancients; and it is the opinion of M. de la Chapelle, who in the year 1772 published an ingenious work on the subject, that the responses of many of the oracles were delivered by persons thus qualified to serve the purposes of priest-craft and delusion. As the ancient ventriloquists, when exercising their art, seemed generally to speak from their own bellies, the name by which they were designed was abundantly significant; but it is with no great propriety that modern performers are called *ventriloquists*, and their art *ventriloquism*, since they appear more frequently to speak from the pockets of their neighbours, or from the roof or distant corners of the room, than from their own mouths or their own bellies.

From Brodeau, a learned critic of the 16th century, we have the following account of the feats of a capital ventriloquist and cheat, who was valet de chambre to Francis the First. The fellow, whose name was *Louis Brabant*, had fallen desperately in love with a young, handsome, and rich heiress; but was rejected by the parents as an unsuitable match for their daughter, on account of the lowness of his circumstances. The young lady's father dying, he made a visit to the widow, who was totally ignorant of his singular talent. Suddenly, on his first appearance, in open day, in her own house, and in the presence of several persons who were with her, she heard herself accosted, in a voice perfectly resembling that of her dead husband, and which seemed to proceed from above, exclaiming, "Give my daughter in marriage to Louis Brabant: He is a man of great fortune, and of an excellent character. I now endure the inexpressible torments of purgatory, for having refused her to him. If you obey this admonition, I shall soon be delivered from this place of torment. You will at the same time provide a worthy husband for your daughter, and procure everlasting repose to the soul of your poor husband."

The widow could not for a moment resist this dread summons, which had not the most distant appearance of proceeding from Louis Brabant; whose countenance exhibited no visible change, and whose lips were close and motionless, during the delivery of it. Accordingly, she consented immediately to receive him for her son-in-law. Louis's finances, however, were in a very low situation; and the formalities attending the marriage contract rendered it necessary for him to exhibit some show of riches, and not to give the ghost the lie direct. He accordingly went to work upon a fresh subject, one Cornu, an old and rich banker at Lyons; who had accumulated immense wealth by usury and extortion, and was known to be haunted by remorse of conscience on account of the manner in which he had acquired it.

Having contracted an intimate acquaintance with this man, he, one day while they were sitting together in the usurer's little back parlour, artfully turned the conversation on religious subjects, on demons and spectres, the pains of purgatory, and the torments of hell. During an interval of silence between them, a voice was heard, which to the astonished banker seemed to be that of his deceased father,

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complaining, as in the former case, of his dreadful situation in purgatory, and calling upon him to deliver him instantly from thence, by putting into the hands of Louis Brabant, then with him, a large sum for the redemption of Christians then in slavery with the Turks; threatening him at the same time with eternal damnation if he did not take this method to expiate likewise his own sins. The reader will naturally suppose that Louis Brabant affected a due degree of astonishment on the occasion; and further promoted the deception, by acknowledging his having devoted himself to the prosecution of the charitable design imputed to him by the ghost. An old usurer is naturally suspicious. Accordingly the wary banker made a second appointment with the ghost's delegate for the next day; and, to render any design of imposing upon him utterly abortive, took him into the open fields, where not a house, or a tree, or even a bush, or a pit, were in sight, capable of screening any supposed confederate. This extraordinary caution excited the ventriloquist to exert all the powers of his art. Wherever the banker conducted him, at every step his ears were saluted on all sides with the complaints and groans not only of his father, but of all his deceased relations, imploring him for the love of God, and in the name of every saint in the calendar, to have mercy on his own soul and theirs, by effectually seconding with his purse the intentions of his worthy companion. Cornu could no longer resist the voice of heaven, and accordingly carried his guest home with him, and paid him down 10,000 crowns; with which the honest ventriloquist returned to Paris, and married his mistress.—The catastrophe was fatal. The secret was afterwards blown, and reached the usurer's ears, who was so much affected by the loss of his money, and the mortifying railleries of his neighbours, that he took to his bed and died.

This trick of Louis Brabant is even exceeded by an innocent piece of waggery played off not 40 years ago by another French ventriloquist on a whole community. We have the story from M. de la Chapelle, who informs us, that M. St Gill the ventriloquist and his intimate friend, returning home from a place whither his business had carried him, sought for shelter from an approaching thunder storm in a neighbouring convent. Finding the whole community in mourning, he inquired the cause, and was told that one of their body had died lately, who was the ornament and delight of the whole society. To pass away the time, he walked into the church, attended by some of the religious, who showed him the tomb of their deceased brother, and spoke feelingly of the scanty honours they had bestowed on his memory. Suddenly a voice was heard, apparently proceeding from the roof of the quire, lamenting the situation of the defunct in purgatory, and reproaching the brotherhood with their lukewarmness and want of zeal on his account. The friars, as soon as their astonishment gave them power to speak, consulted together, and agreed to acquaint the rest of the community with this singular event, so interesting to the whole society. M. St Gill, who wished to carry on the joke still farther, dissuaded them from taking this step; telling them that they would be treated by their absent brethren as a set of fools and visionaries. He recommended to them, however, the immediately calling of the whole community into the church, where the ghost of their departed brother might probably reiterate his complaints. Accordingly all the friars, novices, lay-brothers, and even the domestics of the convent, were immediately summoned and collected together. In a short time the voice from the roof renewed its lamentation and reproaches, and the whole convent fell on their faces, and vowed a solemn reparation. As a first step, they chanted a *De profundis* in a full choir; during the intervals of which the ghost occasionally expres-

sed the comfort he received from their pious exercises and ejaculations on his behalf. When all was over, the prior entered into a serious conversation with M. St Gill; and on the strength of what had just passed, sagaciously inveighed against the absurd incredulity of our modern sceptics and pretended philosophers on the article of ghosts or apparitions. M. St Gill thought it now high time to disabuse the good fathers. This purpose, however, he found it extremely difficult to effect, till he had prevailed upon them to return with him into the church, and there be witnesses of the manner in which he had conducted this ludicrous deception.

A ventriloquist, who performed feats somewhat similar to these, made his appearance in Edinburgh, and many of the other towns of Scotland, a few months before the writing of this article. He imitated successfully the voice of a squeaking child, and made it appear to proceed from whatever place he chose; from the pockets of the company, from a wooden doll, with which he held many spirited conversations; from beneath a hat or a wine-glass, and out of any person's foot or hand. When the voice seemed to come from beneath a glass or hat, it was dull and on a low key, as sounds confined always are; and what evinced his dexterity was, that when the glass was raised from the table during the time of his speaking, the words or syllables uttered afterwards were on a higher key, in consequence, one would have thought, of the air being readmitted to the speaker. This part of the experiment failed, however, when the management of the glass was at a distance committed to any of the company; but as the room was not well illuminated, we are inclined to attribute this failure to the ventriloquist's not being able to perceive at what precise instant of time the glass was removed from the table. The same artist imitated the tones of a scolding old woman, disturbed at unreasonable hours by a person demanding admission into her house; but this exhibition did not to us appear masterly. The tones of the old woman and the child were not accurately discriminated: the child was a young scold, and the scold spoke like an angry child. We have heard that, when in Edinburgh, the same practitioner astonished a number of persons in the Fishmarket, by making a fish appear to speak, and give the lie to its vender, who affirmed that it was fresh, and caught in the morning; and whether this fact was really performed or not, we cannot doubt, from what we saw and heard him do, but that he was fully equal to its performance.

Our ventriloquist was an illiterate man; and though sufficiently communicative, could not make intelligible to us the manner in which he produced these acoustic deceptions. Indeed if he had, we should hardly have described the practical rules of the art to the public; for though it is proper to make the existence of such an art universally known, it will readily occur to every reflecting mind, that the attainment of it should not be rendered easy to those who, like Louis Brabant, might make it subservient to the purposes of knavery and deception. The speculative principles on which it is founded must be obvious to every man who has studied the philosophy of the human mind, and has ever witnessed the feats of mimicry.

It has been shown elsewhere (see METAPHYSICS, n° 47, 48.), that, previous to experience, we could not refer sound to any external cause; that it does not therefore give immediate indication of the place or distance of the sonorous body; and that it is only by the association of place with sound that the latter becomes an indication of the former. This being admitted, nothing seems requisite to fit a man for becoming an expert ventriloquist but a delicate ear, flexibility of the organs of speech, and long practice of those rules

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quism,
Venus.

rules which repeated trials would enable him to discover. A delicate ear perceives every difference which change of place produces in the same sound; and if a person possessed of such an ear have sufficient command over his organs of speech, to produce by them a sound in all respects similar to another proceeding from any distant object, it is evident that to the audience the sound which he utters must appear to proceed from that object. If this be the true theory of ventriloquism, it does not seem to be possible for the most expert ventriloquist to speak in his usual tones of conversation, and at the same time make the voice appear to come from a distance; for these tones must be supposed familiar to his audience, and to be in their minds associated with the ideas of his figure, place, and distance. Hence the ventriloquist whom we saw appeared to speak from various places only in the tones of the squeaking child, while Louis Brabant and M. St Gille, in their great feats, imitated the voices of ghosts, to which no man could be familiar, and where terror would greatly contribute to the deception. There can, however, be no doubt, but that if, by a peculiar modification of the organs of speech, a sound of any kind can be produced, which in faintness, tone, body, and in short every other sensible quality, perfectly resembles a sound delivered from the roof of an opposite house; the ear will naturally, without examination, refer it to that situation and distance, the sound which the person hears being only a sign, which he has from his infancy been constantly accustomed, by experience, to associate with the idea of a person speaking from a house-top. It is evident too, that when there is no particular ground of suspicion, any small disparity between the two sounds will not be perceptible. But if our theory be just, that experience or habit which misleads a person who has seldom heard the ventriloquist, and is a stranger to his powers, at length sets another person right who is acquainted with them, and has been a frequent witness of their effects. This was actually the case of M. de la Chapelle, with whom the illusion at length ceased, in consequence of repeated visits to M. St Gille: so that while others, ignorant of his talent, and possessed only of their old or habitual experience with regard to articulate sounds, considered his voice as coming from the top of a tree, or from a deep cellar under ground; our author, well acquainted with the powers of the ventriloquist, and having acquired a new kind of experience, at once referred it directly to the mouth of the speaker.

VENUS, in Pagan worship, the goddess of love and beauty. Cicero mentions two other deities of this name. Venus, styled *Urania* and *Celestis*; and the *Venus Pandemos* or *Popularis*, the wife of Vulcan, and the goddess of wanton and effeminate love. To the first the Pagans ascribed no attributes but such as were agreeable to the strictest chastity and virtue; and of this deity they admitted no corporeal resemblance, she being only represented by the form of a globe, ending conically. Her sacrifices were termed *nephelia*, on account of their sobriety. To her honey and wine were offered, and no animal except the heifer; and on her altars the wood of figs, vines, or mulberries, were not suffered to be burnt. The Romans dedicated a temple to this goddess, to whom they gave the name of *Verticordia*; because she turned the hearts of lewd women, and inspired modesty and virtue.

But the most famous of these goddesses is the wife of Vulcan; who is represented as springing from the froth raised by the genitals of Saturn, when cut off by Jupiter and thrown into the sea. As soon as she was formed, she was laid in a beautiful shell embellished with pearl, and wafted by gentle zephyrs to the isle of Cytherea, whence she sailed to Cyprus. At her landing, flowers rose beneath her feet;

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she was received by the Hours, who braided her hair with golden fillets; and then wafted her to heaven, where her charms appeared so attractive, that most of the gods desired her in marriage; but Vulcan, by the advice of Jupiter, gained possession by putting poppies into her nectar. As Venus was the goddess of love and pleasure, the poets have been lavish in the description of her beauties; and the painters and statuaries have endeavoured to give her the most lovely form. Sometimes she is represented clothed in purple, glittering with gems, her head crowned with roses, and drawn in an ivory car by swans, doves, or sparrows; at others she stands attended by the Graces; but in all positions, her son Cupid is her inseparable companion. She was honoured as the mother of Hymeneus, Cupid, Æneas, and the Graces, and was passionately fond of Adonis and Anchises.

This goddess was principally worshipped at Paphos and Cyprus; and the sacrifices offered to her were white goats and swine, with libations of wine, milk, and honey. Her victims were crowned with flowers, or wreaths of myrtle.

VENUS, in astronomy. See ASTRONOMY-Index, and PNEUMATICS, n^o 237.

VENUS's Fly-trap. See *DIONÆA Muscipula*.

VENUS, in zoology, a genus of insects belonging to the order of vermes testacea. This animal is a tethys: the shell is bivalve; the hinge with three teeth near each other, one placed longitudinally and bent inwards. There are a great many species; of which the most remarkable is the *merenaria*, or commercial, with a strong, thick, weighty shell, covered with a brown epidermis; pure white within; slightly striated transversely. Circumference above 11 inches.—These are called in North America *clams*; they differ from other species only in having a purple tinge within. Wampum, or Indian money, is made of them.

VEPRECULÆ, diminutive from *vepres*, “a briar or bramble; the name of the 31st order in Linnæus's Fragments of a Natural Method. See BOTANY, Sect. 6.

VERA-CRUZ, a sea port town of North America, in New Spain, with a very secure and commodious harbour, defended by a fort. Here the Flotilla annually arrives from Spain to receive the produce of the gold and silver mines of Mexico; and at the same time a fair is held here for all manner of rich merchandise brought from China and the East Indies by way of the South Sea, and for the merchandise of Europe by the way of the Atlantic Ocean. This town is not two miles in circumference; and about it there is a wall of no great strength on the land-side. The air is unwholesome; and there are very few Spaniards here unless when the Flotilla arrives, and then it is crowded with people from all parts of Spanish America. It is 200 miles south-east of Mexico. W. Long. 37. 25. N. Lat. 19. 12.

VERAGUA, a province of New Spain, bounded on the east by that of Costa Rica, on the west by Panama, on the north by Darien and the Gulf of Mexico, and on the south by the South Sea. It is about 125 miles in length from east to west, and 60 in breadth from north to south. It is a mountainous barren country; but has plenty of gold and silver. Conception is the capital town.

VERATRUM, in botany: A genus of plants of the class of *polygamia*, and order of *monœcia*; and in the natural system arranged under the 10th order, *Coronaria*. There is no calyx; the corolla has six petals; there are six stamens: the hermaphrodite flowers have three pistils and three capsules. There are three species, none of which are natives of Britain.

The most important is the *album*, or hellebore, the root of which is perennial, about an inch thick, externally brown, internally white, and beset with many strong fibres; the

4 M

stalk

Venus
||
Veratrum.

Veratrum stalk is thick, strong, round, upright, hairy, and usually rises four feet in height: the leaves are numerous, very large, oval, entire, ribbed, plaited, without footstalks, of a yellowish green colour, and surround the stem at its base: the flowers are of a greenish colour, and appear from June to August in very long, branched, terminal spikes.

It appears from various instances, that every part of the plant is extremely acrid and poisonous, as its leaves and even seeds prove deleterious to different animals.

Woodville's
Medical Bo-
tany.

The ancients, though sufficiently acquainted with the virulency of their white hellebore, were not deterred from employing it internally in several diseases, especially those of a chronic and obstinate kind, as mania, melancholia, hydrops, elephantiasis, epilepsy, vitiligo, lepra, rabies canina, &c. They considered it the safer when it excited vomiting, and Hippocrates wished this to be its first effect. To those of weak constitutions, as women, children, old men, and those labouring under pulmonary complaints, its exhibition was deemed unsafe; and even when given to the robust, it was thought necessary to moderate its violence by different combinations and preparations; for it was frequently observed to effect a cure, not only by its immediate action upon the primæ viæ, but when no sensible evacuations was promoted by its use.

Greting employed it in a great number of cases of the maniacal and melancholic kind; the majority of these, as might be expected, derived no permanent benefit; several, however, were relieved, and five completely cured by this medicine. It was the bark of the root, collected in the spring, which he gave in powder, beginning with one grain: this dose was gradually increased according to its effects. With some patients one or two grains excited nausea and vomiting, but generally eight grains were required to produce this effect, though in a few instances a scruple and even more was given.

Veratrum has likewise been found useful in epilepsy, and other convulsive complaints; but the diseases in which its efficacy seems least equivocal, are those of the skin; as scabies and different prurient eruptions, herpes, morbus pediculosis, lepra, scrophula, &c. and in many of these it has been successfully employed both internally and externally.

As a powerful stimulant, and irritating medicine, its use has been resorted to only in desperate cases, and then it is first to be tried in very small doses in a diluted state, and to be gradually increased according to the effects.

VERB, in grammar. See GRAMMAR, Chap. IV.

VERBASCUM, in botany: A genus of plants of the class of *pentandria*, and order of *monogynia*; and in the natural system arranged under the 28th order, *Lurida*. The corolla is rotated, and rather unequal: the capsule is monolocular and bivalved. There are 12 species, five of which are natives of Britain; 1. The *thapsus*, or great mullein, which has a stem single, simple, erect, covered with leaves, about six feet high. Leaves large, broad, white, woolly on both sides, sessile, decurrent. Flowers terminal, in a long spike, sessile, yellow.

Catarrhal coughs and diarrhoeas are the complaints for which it has been internally prescribed. Dr Home tried it in both, but it was only in the latter disease that this plant succeeded. He relates four cases in which a decoction of verbascum was given; and from which he concludes, that it "is useful in diminishing or stopping diarrhoeas of an old standing, and often in easing the pains of the intestines. These acquire a great degree of irritability; and the ordinary irritating causes, aliment, bile, distension from air, keep up a quicker peristaltic motion. This is

obviated by the emollient and perhaps gentle astringent qualities of this plant."

2. The *nigrum*, or black mullein, having a stem beset with hairs that are beautifully branched; the blossoms yellow, with purple tips. It is a beautiful plant, and the flowers are grateful to bees. Swine eat it; sheep are not fond of it; cows, horses, and goats, refuse it. The other British species are the *lychnitis*, *nigrum*, *blattasi*, and *virgatum*.

VERBENA, in botany: A genus of plants of the class of *diandria*, and order of *monogynia*; and in the natural system arranged under the 40th order, *Personata*. There are 17 species, only one of which is a native of Britain; the *officinalis*, or common vervain, which grows on the roadsides near towns and villages. The leaves have many jagged clefts, the blossoms are pale blue. It manifests a slight degree of astringency, and was formerly much in vogue as a deobstruent; but is now disregarded. Mr Millar says that it is never found above a quarter of a mile from a house; whence the common people in England call it *Simpler's joy*, because, wherever it is found, it is a certain sign of a house being near. Sheep eat it; cows, horses, and goats refuse it.

VERD (Cape), a promontory on the west coast of Africa, 40 miles north-west of the mouth of the river Gam-bia. W. Long. 17. 38. N. Lat. 14. 45.

The islands of Cape de Verd are seated in the Atlantic Ocean, about 400 miles west of the Cape. They are between the 13th and 19th degree of latitude; and the principal are 10 in number, lying in a semicircle. Their names are, *St Antony*, *St Vincent*, *St Lucia*, *St Nicholas*, the *Isle of Sal*, *Bona Vista*, *Mayo*, *St Jago*, *Fuego*, and *Brawa*.

VERDICT (*Vere dictum*), is the answer of the jury given to the court concerning the matter of fact, in any case civil or criminal, committed by the court to their trial and examination. See LAW, N° clxxxvi. 51. and TRIAL.

VERDIGRISE, the acetite of copper, much used by painters as a green colour. It is chiefly manufactured at Montpellier; the vines of Languedoc being very convenient for this purpose. See CHEMISTRY, n° 872.

The following process for making verdigrise is described by Mr Monet of the Royal Society of Montpellier, and is published among the memoirs of the academy for the years 1750 and 1753.

Vine stalks well dried in the sun are steeped during eight days in strong wine, and afterwards drained. They are then put into earthen pots, and upon them wine is poured. The pots are carefully covered. The wine undergoes the acetous fermentation, which in summer is finished in seven or eight days; but requires a longer time in winter, although this operation is always performed in cellars. When the fermentation is sufficiently advanced, which may be known by observing the inner surface of the lids of the pots, which during the progress of the fermentation is continually wetted by the moisture of the rising vapours, the stalks are then to be taken out of the pots. These stalks are by this method impregnated with all the acid of the wine, and the remaining liquor is but a very weak vinegar. The stalks are to be drained during some time in baskets, and layers of them are to be put into earthen pots with plates of Swedish copper, so disposed that each plate shall rest upon and be covered with layers of stalks. The pots are to be covered with lids; and the copper is thus left exposed to the action of the vinegar, during three or four days, or more, in which time the plates become covered with verdigrise. The plates are then to be taken out of the pots, and left in the cellar three or four days; at the end of which time they are to be moistened with water, or with the weak vinegar above mentioned, and left to dry. When this moistening and drying

Verbena
Verdigrise.

Verditer, of the plates has been thrice repeated, the verdigrise will be found to have considerably increased in quantity; and it may then be scraped off for sale.

Vere. A solution or erosion of copper, and consequently of verdigrise, may be prepared by employing ordinary vinegar instead of wine, as is directed in the above process. But it would not have the unctuousity of ordinary verdigrise, which quality is necessary in painting. Good verdigrise must be prepared by means of a vinous acid, or solvent half acid and half spirituous. Accordingly, the success of the operation depends chiefly on the degree of fermentation to which the wine employed has been carried: for this fermentation must not have been so far advanced that no sensibly vinous or spirituous parts remained in the liquor.

Verdigrise is employed externally for deterring foul ulcers, and as an escharotic. It is rarely or never given internally. Some recommend it indeed in the dose of a grain or two as an emetic, which operates almost as soon as received into the stomach, and which may therefore be of use where poisonous substances have been taken, to procure their immediate rejection. It appears, however, highly imprudent to have recourse on such occasions to a remedy in itself so dangerous and so virulent; and more especially as a speedy evacuation may generally be obtained by means of substances which are not only innocent, but at the same time weaken the force of the poison by diluting and obtunding it; as warm water, milk, oils. It is accordingly excluded from the present pharmacopœia.

VERDITER, or **VERDATER**, a preparation of copper, sometimes used by the painters, &c. for a blue; but more usually mixed with a yellow for a green colour. See **CHEMISTRY**, n° 758, and **COLOUR-Making**, n° 28.

VERE (Sir Francis), a renowned English general, was the second son of Geoffrey de Vere, a branch of the ancient family of that name, earls of Oxford, and was born in the year 1554. Concerning his education we are uninformed. About the age of 31 he embarked with the troops sent by Queen Elizabeth, under the command of the earl of Leicester, to the assistance of the states of Holland; in which service his courage and military genius became immediately conspicuous: but his gallant behaviour in the defence of Bergen-op-Zoom, in the year 1588, when besieged by the prince of Parma, established his reputation. After the siege was raised, he received the honour of knighthood from lord Willoughby, who succeeded the earl of Leicester in the command. He continued in the service of the states till about the year 1595; during which time, namely, in 1593, he was elected member of parliament for Leominster in Herefordshire. The famous expedition against Cadiz being resolved upon, Sir Francis Vere was called home, and appointed to a principal command under the earl of Essex. The success of this enterprise is universally known. In 1597 we find him again in Holland, present at the battle of Turnhout, of which he has given a particular description in his Commentaries. In the same year he embarked, with the earl of Essex, in the expedition to the Azores; and at his return was appointed governor of the Briel in Holland, with the command of the English troops in the service of the states. In 1600 he was one of the three generals at the battle of Newport, and had the honour of having the victory universally ascribed to his conduct and resolution. The states of Holland, then at war with Spain, marched their army with an intention to besiege Newport in Flanders. The commanders were, count Ernest of Nassau, count Somes, and Sir Francis Vere. The Spaniards marched to intercept them, and this battle ensued. Sir Francis was shot first through the leg, and then through the same thigh; notwithstanding which, he rallied the flying army,

and led them on to victory. The Spaniards lost 120 ensigns, and most of their foot were slain. Queen Elizabeth on this occasion declared him the *worthiest captain of her time*. (See *Letters of the Sidney Family*, vol. ii. p. 104.) But the last and most glorious achievement of his life was his gallant defence of Ostend, with about 1600 men, against an army of 12,000, from July 1601 until March 1602, when he resigned the government, and returned to Holland. An account of this memorable siege, which lasted above three years, to the destruction of the best troops of Holland, Spain, France, England, Scotland, and Italy, the reader may see in *Vere's Commentaries*, with the Continuation at the end. Queen Elizabeth died in the year 1603: the peaceful James succeeded to the throne; and Sir Francis Vere, with all the heroes of his time, sheathed his sword. He died in 1608, in the 54th year of his age; and was buried in St John's Chapel in Westminster abbey, where a splendid monument was erected to his memory. He married the daughter of ——— Dent, a citizen of London, by whom he had three sons and two daughters, none of whom survived him. He will ever be remembered by posterity as one of the greatest heroes of our most heroic age. — The work above mentioned is intitled, "The Commentaries of Sir Francis Vere, being diverse pieces of service wherein he had command; written by himself by way of commentary." Cambridge, 1657, folio. It is elegantly printed, and adorned with prints of Sir Francis, Sir Horace Vere, Sir John Ogle, maps, and plans of battles, &c.

VERGE (*Virgata*), in law, signifies the compass of the king's court, which bounds the jurisdiction of the lord steward of the household; and which is thought to have been 12 miles round.

The term *verge* is also used for a stick or rod, whereby one is admitted tenant to a copyhold estate, by holding it in his hand, and swearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's bench and common pleas, whose business it is to carry white wands before the judges. There are also vergers of cathedrals, who carry a rod tipped with silver before the bishop, dean, &c.

VERGIL (Polydore). See **VIRGIL**.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from sweet ones, whilst yet acid and unripe. Its chief use is in sauces, ragouts, &c. though it is also an ingredient in some medicinal compositions, and is used by the wax-chandlers to purify their wax.

VERMES, the sixth class of animals in the Linnæan system, comprehending five orders. See **NATURAL HISTORY**, and **ZOOLOGY**.

VERMICELLI, or **VERMICHELLY**, a composition of flour, cheese, yolks of eggs, sugar, and saffron, reduced to a paste, and formed into long slender pieces like worms, by forcing it with a piston through a number of little holes. It was first brought from Italy, where it is in great vogue: it is chiefly used in soups and pottages, to provoke venery, &c.

VERMICULAR, an epithet given to any thing that bears a relation or resemblance to worms.

VERMIFORMIS, in anatomy, a term applied to various parts in the human-body, bearing some resemblance to worms.

VERMILION, a very bright and beautiful red colour, composed of quicksilver and sulphur, in great esteem among the ancients under the name of *minium*; but what goes by the name of minium amongst us, is a preparation of lead, known also by the name of *red-lead*. See **CHEMISTRY**, n° 1404.

VERMIN, a collective name, including all kinds of little animals

Verge
||
Vermin.

Vernacular animals and insects, which are hurtful or troublesome to mankind, beasts, or fruits, &c. as worms, lice, fleas, caterpillars, ants, flies, &c.

VERNACULAR, a word applied to something that is peculiar to any one country.

VERNAL, something belonging to the spring-season.

VERNIER SCALE, a scale excellently adapted for the graduation of mathematical instruments, thus called from its inventor Peter Vernier, a person of distinction in the Franche Comté. See NONIUS.

Vernier's method is derived from the following principle. If two equal right lines, or circular arcs, A, B, are so divided, that the number of equal divisions in B is one less than the number of equal divisions of A, then will the excess of one division of B above one division of A be compounded of the ratios of one of A to A, and of one of B to B.

For let A contain 11 parts, then one of A to A is as 1 to 11, or $\frac{1}{11}$. Let B contain 10 parts, then one of B to

B is as 1 to 10, or $\frac{1}{10}$. Now $\frac{1}{10} - \frac{1}{11} = \frac{11 - 10}{10 \times 11} =$

$$\frac{1}{10 \times 11} = \frac{1}{10} \times \frac{1}{11}.$$

Or if B contains n parts, and A contains $n + 1$ parts; then $\frac{1}{n}$ is one part of B, and $\frac{1}{n + 1}$ is one part of A.

$$\text{And } \frac{1}{n} - \frac{1}{n + 1} = \frac{n + 1 - n}{n \times n + 1} = \frac{1}{n \times n + 1}.$$

The most commodious divisions, and their aliquot parts, into which the degrees on the circular limb of an instrument may be supposed to be divided, depend on the radius of that instrument.

Let R be the radius of a circle in inches; and a degree to be divided into n parts, each being $\frac{1}{p}$ th part of an inch.

Now the circumference of a circle, in parts of its diameter $2R$ inches, is $3,1415926 \times 2R$ inches.

Then $360^\circ : 3,1415926 \times 2R :: 1^\circ : \frac{3,1415926}{360} \times 2R$ inches.

Or, $0,01745329 \times R$ is the length of one degree in inches.

Or, $0,01745329 \times R \times p$ is the length of 1° , in p th parts of an inch.

But as every degree contains n times such parts, therefore $n = 0,01745329 \times R \times p$.

The most commodious perceptible division is $\frac{1}{8}$ or $\frac{1}{10}$ of an inch.

Example. Suppose an instrument of 30 inches radius, into how many convenient parts may each degree be divided? how many of these parts are to go to the breadth of the vernier, and to what parts of a degree may an observation be made by that instrument?

Now $0,01745 \times R = 0,5236$ inches, the length of each degree: and if p be supposed about $\frac{1}{8}$ of an inch for one division; then $0,5236 \times p = 4,188$ shows the number of such parts in a degree. But as this number must be an integer, let it be 4, each being $15'$: and let the breadth of the vernier contain 31 of those parts, or $7\frac{1}{4}^\circ$, and be divided into 30 parts.

Here $n = \frac{1}{4}$; $m = \frac{1}{30}$; then $\frac{1}{4} \times \frac{1}{30} = \frac{1}{120}$ of a de-

gree, or $30'$, which is the least part of a degree that instrument can show.

If $n = \frac{1}{5}$, and $m = \frac{1}{36}$; then $\frac{1}{5} \times \frac{1}{36} = \frac{60}{5 \times 36}$ of a minute, or $20''$.

The following table, taken as examples in the instruments commonly made from 3 inches to 8 feet radius, shows the divisions of the limb to nearest tenths of inches, so as to be an aliquot of 60's, and what parts of a degree may be estimated by the vernier, it being divided into such equal parts, and containing such degrees as their columns show.

Rad. inches.	Parts in a deg.	Parts in vernier.	Breadth of vernier.	Parts observed.
3	1	15	$15\frac{1}{4}$	4' 0"
6	1	20	$20\frac{1}{4}$	3 0
9	2	20	$10\frac{1}{4}$	1 30
12	2	24	$12\frac{1}{4}$	1 15
15	3	20	$6\frac{1}{4}$	1 0
18	3	30	$10\frac{1}{4}$	0 40
21	4	30	$7\frac{1}{4}$	0 30
24	4	36	$9\frac{1}{4}$	0 25
30	5	30	$7\frac{1}{4}$	0 20
36	6	30	$5\frac{1}{4}$	0 20
42	8	30	$3\frac{7}{8}$	0 15
48	9	40	$4\frac{5}{8}$	0 10
60	10	36	$3\frac{7}{10}$	0 10
72	12	30	$2\frac{7}{12}$	0 10
84	15	40	$2\frac{3}{4}$	0 6
96	15	60	4	0 4

By altering the number of divisions, either in the degrees or in the vernier, or in both, an angle can be observed to a different degree of accuracy. Thus, to a radius of 30 inches, if a degree be divided into 12 parts, each being five minutes, and the breadth of the vernier be 21 such parts, or $1\frac{1}{2}^\circ$, and divided into 20 parts, then $\frac{1}{12} \times \frac{1}{20} =$

$$\frac{1^\circ}{240} = 15'' : \text{or taking the breadth of the vernier } 2\frac{7}{12}^\circ,$$

and divided into 30 parts; then $\frac{1}{12} \times \frac{1}{30} = \frac{1^\circ}{360}$, or $10''$:

Or $\frac{1}{12} \times \frac{1}{50} = \frac{1^\circ}{600} = 6''$; where the breadth of the vernier is $4\frac{1}{2}^\circ$.

VERONA, a city of Italy, capital of the Veronese, in the territory of Venice, situated near the mountains, on the river Adige, in E. Long. 11. 24. N. Lat. 45. 26. It is seven miles in compass; and has been so fortified by the Venetians, that it is now looked upon as impregnable. It contains 57,400 inhabitants.

VERONESE, a territory of Italy, in the republic of Venice, bounded on the north by the Trentino, on the east by the Vicentino and Paduano, on the south by the Mantuano, and on the west by the Bresciano. It is about 35 miles in length, and 27 in breadth; and is one of the most fertile countries in Italy, abounding in corn, wine, fruits, and cattle.

VERONESE. See CAGLIARI.

VERONICA, in botany: A genus of plants of the class of diandria, and order of monogynia; and in the natural system arranged under the 40th order, *Personata*. There are 40 species;

Vernier
Veronica

Verfailles
||
Vertex.

species; 15 are natives of Britain, only two of which have been applied to any use. 1. The *officinalis*, common male speedwell, or fluellin; a native of Britain, growing on heaths and barren grounds. The blossoms are blue, the leaves elliptical, serrated, and hairy. The leaves have a small degree of astringency, and are somewhat bitter. An infusion of them is recommended by Hoffman as a substitute for tea; but is more astringent and less grateful. The herb was formerly esteemed in medicine for various disorders, but is now almost totally disused. Cows, sheep, goats, and horses, eat it; swine refuse it. 2. The *beccabunga*, or common brook-lime, the flowers of which are blue, in loose lateral spikes; leaves sessile, oval, opposite, thick, notched.

This plant was formerly considered as of much use in several diseases, and was applied externally to wounds and ulcers; but if it have any peculiar efficacy, it is to be derived from its antiscorbutic virtue. As a mild refrigerant juice it is preferred where an acrimonious state of the fluids prevails, indicated by prurient eruptions upon the skin, or in what has been called the *hot scurvy*. We must, however, acknowledge, that we should expect equal benefit from the same quantity of any other bland fresh vegetable matter taken into the system. To derive much advantage from it, the juice ought to be used in large quantities, or the fresh plant eaten as food.

VERSAILLES, a town of France, in the late province of the Isle of France, 10 miles west-south-west of Paris. It contains 60,000 inhabitants, and since the Revolution has been created a bishop's see. In the reign of Louis XIII. it was only a small village. This prince built here a hunting-hut in 1630, which Bassompierre calls "the paltry chateau of Versailles." Although the situation was low and very unfavourable, Louis XIV. built a magnificent palace here, which was the usual residence of the kings of France till the 6th of October 1789, when the late unfortunate Louis XVI. and his family were removed from it to the Thuilleries. The buildings and the gardens are adorned with a vast number of statues, done by the greatest masters, and the water-works are all worthy of admiration. The great gallery is thought to be as curious a piece of workmanship of that kind as any in the world: nor is the chapel less to be admired for its fine architecture and ornaments. The gardens, with the park, are five miles in circumference, and surrounded by walls. There are three fine avenues to Versailles, one of which is the common road to Paris, the other comes from Seaux, and the third from St Cloud. E. Long. 2. 12. N. Lat. 48. 48.

VERSE, in poetry, a line consisting of a number of long and short syllables, which run with an agreeable cadence.

VERSE is also used for a part of a chapter, section, &c.

VERSIFICATION, the art or manner of making verse; also the tune and cadence of verse. See POETRY, Part III.

VERSION, a translation of some book or writing out of one language into another. See TRANSLATION.

VERT, in heraldry, the term for a green colour. It is called *vert* in the blazon of the coats of all under the degree of nobles: but in coats of nobility it is called *emerald*; and in those of kings *venus*. In engraving it is expressed by diagonals, or lines drawn athwart from right to left, from the dexter chief corner to the sinister base.

VERTEBRÆ, in anatomy. See there no 30.

VERTEX, in anatomy, denotes the crown of the head. Hence vertex is also used figuratively for the top of other things: thus we say, the vertex of a cone, pyramid, &c.

VERTEX, is also used in astronomy for the point of the heaven directly over our heads, properly called the *zenith*.

VERTICILLATÆ, the name of a class in Ray's and Boerhaave's Methods, consisting of herbaceous vegetables, having four naked seeds, and the flowers placed in whorls round the stalk. The term is synonymous to the *labiati*, or lip-flowers of Tournefort; and is exemplified in mint, thyme, and savory. Verticillatæ is also the name of the 42d order in Linnæus's Fragments of a Natural Method, consisting of plants which answer the above description.

VERTICILLUS, a mode of flowering, in which the flowers are produced in rings at each joint of the stem, with very short foot-stalks. The term is exemplified in mint, hore-hound, and the other plants of the natural order described above.

VERTICITY, is that property of the loadstone whereby it turns or directs itself to one particular point.

VERTIGO, in medicine. See there, n° 82.

VERTUMNUS, in mythology, a god who presided over gardens and orchards, honoured among the Etruscans, from whom the worship of this deity was transmitted to the Romans.

Ovid has described the various forms assumed by this deity, in order to obtain the love of Pomona. Some have supposed that Vertumnus, whose name they derive *a vertendo*, because he had power to change his form at pleasure, marked the year and its variations; and thus they say he pleased Pomona, by bringing the fruits to maturity. Accordingly, Ovid says, that he assumed the form of a labourer, reaper, vine-dresser, and old woman, to represent the four seasons, spring, summer, autumn, and winter. Vertumnus had a temple near the market-place at Rome, being represented as one of the tutelary deities of the merchants. The commentators on Ovid say, that he was an ancient king of Hetruria, who, by his diligent and successful cultivation of fruits and gardens, obtained the honour of being ranked among the gods.

VERUMONTANUM, in anatomy, a small eminence near the passages where the semen is discharged into the urethra.

VERVAIN, in botany. See VERBENA.

VERTOT d'AUBOEF (Rene Aubert de), a celebrated historian, was descended from a noble and ancient family in Normandy, and born in 1655. At 16 years of age he became a Franciscan friar; afterwards he entered into the order of the Premonstratenses, in which he had several benefices; and at length was a secular ecclesiastic. He became secretary to the duchess of Orleans, member of the Academy of Inscriptions, and historiographer of Malta. He died at Paris in 1735. His principal works are, 1. The History of the Revolutions of Sweden. 2. The Revolutions of Portugal. 3. The Revolutions of the Romans. 4. The History of Malta. These works are written in elegant French, and translated into most of the languages of Europe.

VERULAM. See BACON.

VESALIUS (Andreas), a celebrated physician and anatomist, was born at Brussels about the year 1512. He studied physic at Paris under James Sylvius; but applied himself chiefly to anatomy, which was then very little known, dissections being esteemed unlawful and impious; and it appears from his work *De humani corporis fabrica*, that he perfected himself in this useful knowledge very early. About the year 1537, the republic of Venice made him professor in the university of Padua, where he taught anatomy for seven years; Charles V. called him to be his physician, as he was also to Philip II. king of Spain. Vesalius was now at the height of his glory, when all of a sudden he formed the design of taking a journey to Palestine; concerning which journey we are told the following story. A young Spanish nobleman he attended, being believed to

Verticillatæ.
||
Vesalius.

Vesicatorium,
Vespa.

be dead, Vesalius obtained leave to open him to explore the true cause of his illness; but when he opened the breast, he perceived symptoms of life, and saw the heart beat. The parents, not satisfied with prosecuting him for murder, accused him of impiety to the inquisition, in hopes that tribunal would punish him with greater rigour: but the King interposing, saved him on condition of his making a pilgrimage to the Holy Land. He was shipwrecked on his return, and thrown upon the island of Zante, where he perished, in 1564. He was the author of several works, the principal of which is *De humani corporis fabrica*.

VESICATORIUM, a **BLISTER**; an application of an acrid nature made to any part of the body, in order to draw a flux of humours to that part, and thus elevate the scarf-skin into a blister.

VESPA, the **WASP**; a genus of insects belonging to the order of hymenoptera. The mouth consists of two jaws without any proboscis; the superior wings are plaited; the eyes are lunar; and there is a sharp sting in the tail. There are 159 species; only 3 of which are natives of Britain, the *crabro*, the *vulgaris*, and the *coarctata*.

1. *Crabro*, the hornet. It has tawny antennæ; the segments of the abdomen are black on the anterior part and yellow on the posterior, with two black spots on each. Its length is an inch; it builds in hollow trees. Its cakes or combs are composed of a substance like coarse paper, or rusty parchment. It is very voracious, devouring other insects, and even bees.

2. *Vulgaris*, the common wasp. The male has seven yellow segments of the abdomen, with a black triangle on each. The head is yellow, and the antennæ long. The upper lip of the female is yellow, the antennæ short; there are six segments of the abdomen with two lateral black spots on each. M. Reaumur and Dr Derham agree in distinguishing three sorts of wasps; viz. the queens or females, the males, and the common labouring wasps, called *mules*, which, according to Reaumur, are neither males nor females, and consequently barren. The queens, of which there is a great number, are much longer in the body, and larger than any other wasp: they have a large heavy belly, corresponding in size to the prodigious quantity of eggs with which they are charged. The males are less than the queens, but longer and larger than the common wasps, which are the smallest of the species: they have no stings, with which both the queens and common wasps are furnished. There are in one nest two or three hundred males, and as many females: but their number depends on the size of the nest; and Dr Derham observed, that the males were bred, or at least mostly resided, in the two cells or partings, between the combs, next to the uppermost cell. The antennæ or horns of the male wasps are longer and larger than those of either of the other sorts: but the chief difference, says Dr Derham, consists in their parts of generation, which are altogether different from those of other wasps.

The mules are the labourers belonging to a nest, and are employed in procuring materials for the nests and in constructing them, and also in furnishing the other wasps, and the young, with provisions.

At the beginning of winter, the wasps destroy all the eggs, and all the young ones without exception: all the mules and males, which have been employed in this work, being unfurnished with provisions, perish; and none survive except some few females, which, according to Reaumur, were fecundated in October, and raise a new colony in the beginning of spring.

In spring a new commonwealth is founded by a single female impregnated during the autumn, and that has

weathered out the severity of the winter. It digs a hole in a dry soil, contrives itself a sinuous inlet, or else it takes up with the dwelling place of a mole, where it hastily builds a few cells and deposits its eggs. Within the space of 20 days, they have gone through the different states of larvæ, chrysalids, and turned to wasps. Nature all-wise provides for every thing. The mule-wasps are the only ones that labour at laying the foundation of the republic. The first eggs that are hatched prove to be neuter-wasps. No sooner are they come into existence, but they fall to work, enlarge the hole, and go about upon wood, lattice-work, and window sashes, in search of materials for building. With their teeth they cut, hack, and tear off small fibres of wood, which they moisten with a liquor they disgorge, and then convey them to the work-shop. Other labourers are in waiting for them, who with those materials set about the construction of the wasp-nest, which is commonly round, and made of materials resembling fine paper. The common covering of it, which is formed of several leaves or layers, with intermediate spaces, is pierced by two holes at a distance from one another, one of which is used for the entrance of the wasps, and the other only for their exit. The space within this covering is cut by a number of horizontal planes, with intervals between them of the size of about half an inch; they are suspended from one another by ligaments, and attached to the covering by their edges: they all have hexagonal cells in their lower surface.

The eggs of the wasp are of an oblong form, and resemble those of a common fly, but they are larger; they are always fastened to the angles of a cell, never to the sides of it. They are usually placed single; it is very rare to find two in one cell; and, if they are laid so, it seems that only one succeeds; for there is never found more than one worm in a cell.

The heads of all the nymphs are turned toward the centre of the comb, and their tails go obliquely downward toward the base of the cell. They are continually seen opening their mouths, and moving their forcipes, seeming ever hungry, and impatiently waiting for food from their parents. The cells are left open till the nymph is at its full growth; then the wasps cover it over with a thin lid, under which the worm undergoes its transformation; and as soon as it is arrived at the wasp-state, it eats its way through this thin cover, and comes to work with the rest. The elder brothers, or first-hatched insects, take amazing care of those born after them, by proportioning their food to the delicacy of their stomach. First, it consists of the juice of fruits and meats; afterwards it is the carcases of insects. The caterers provide for the labourers. Each one takes his own portion; there is no dispute, no fighting. The republic grows daily more numerous, living in profound peace. Every individual, as soon as he has acquired sufficient strength, flies away to the fields. They then become a gang of banditti; they pillage our wall-trees, break into our fruit before its maturity, dart with the fierceness of hawks upon our bees, cut their throats to possess themselves of their honey, plunder and lay waste their commonwealth, riot on the fruits of their labour, and oblige them to remove. During the period of plenty, the wasps bring all the booty to the nest, and share it amongst them. There is nothing then goes forwards but feasting, rioting, and good fellowship; but concord cannot be lasting among robbers. Towards the month of October provisions begin to run short: The neuters and males tear from their cradles the eggs, the larvæ, the chrysalids, and the new-born insects, without showing mercy to any. They next fight against one another. Frosts and rains throw the citizens into a state of languor,

Vespa.

Vespasian languor, and they almost all perish, luckily for us and our bees, some few females alone excepted, which in the ensuing spring become founders of new republics.

Vespertilio.

3. *Coarctata*, the small wasp; has black antennæ, yellowish at the base; the head is black with a yellow spot between the antennæ, and another at the base of the upper lip. Each segment of the abdomen is bordered with yellow. It is about half an inch long. The history, as well as the manners of this species, are the same as those of the common wasp; but their buildings are on a different construction. Their nest is fastened to the branch of a tree with a kind of band; and is in bigness from the size of an orange down to that of an egg. Wood reduced to paper is the material part of it; which if it were of a ruddy colour, might be taken for a large opening rose. It is covered over with a varnish impenetrable by water. One of those nests was neither mollified nor impaired by that element.

VESPASIAN, the 10th emperor of Rome; remarkable for his clemency and other virtues. See ROME, n° 332—339.

VESPER, in the church of Rome, denote the afternoon service; answering in some measure to the evening prayers of the church of England.

VESPERTILIO, the BAT; a genus of quadrupeds, belonging to the order of *primates*. All the teeth are erect, pointed, near each other; and the first four are equal. The fore-feet have the toes connected by a membrane expanded into a kind of wings by which the creature is enabled to fly. There are 28 species, of which 4 are natives of Britain. The most remarkable are,

1. The *vampyrus*, vampire, or Ternate bat, with large canine teeth; four cutting teeth above, the same below; sharp black nose; large naked ears; the tongue is pointed, terminated by sharp aculeated papillæ; talons very crooked, strong, and compressed sidewise; no tail: the membrane divided behind quite to the rump: head of a dark ferruginous colour; on the neck, shoulder, and under-side, of a much lighter and brighter red; on the back the hair shorter, dusky, and smooth: the membranes of the wings dusky. They vary in colour; some being entirely of a reddish brown, others dusky.

These monsters inhabit Guinea, Madagascar, and all the islands from thence to the remotest in the Indian Ocean. They fly in flocks, and perfectly obscure the air with their numbers; they begin their flight from one neighbouring island to another immediately on sunset, and return in clouds from the time it is light till sun-rise. They live on fruits; and are so fond of the juice of the palm-tree, that they will intoxicate themselves with it till they drop on the ground. It is most likely, from the size of their teeth, they are carnivorous. Mr Edwards relates, that they will dip into the sea for fish. They swarm like bees; hanging by one another from the trees in great clusters. The Indians eat them, and declare the flesh to be very good: they grow excessively fat at certain times of the year. The French who live in the Isle de Bourbon boil them in their bouillon, to give it a relish. The negroes have them in abhorrence. Many are of an enormous size: Beckman measured one, whose extent from tip to tip of the wings was five feet four inches; and Dampier another, which extended farther than he could reach with out-stretched arms. Their bodies are from the size of a pullet to that of a dove: their cry is dreadful, their smell rank, their bite, resistance, and fierceness great, when taken.

The ancients had some knowledge of these animals. Herodotus mentions certain winged wild beasts like bats, that molested the Arabs who collected the cassia, to such a degree, that they were obliged to cover their faces, all but

their eyes, with skins. It is very probable, as M. de Buf. *Vespertilio*. remarks, it was from such relations that poets formed their fictions of Harpies.

Linnaeus gives this species the title of *vampyre*; conjecturing it to be the kind which draws blood from people in their sleep. M. de Buffon denies it; ascribing that faculty only to a species found in South America. But there is reason to imagine that this thirst after blood is not confined to the bats of one continent nor to one species: for Bon-tius and Nieuhoff inform us, that the bats of Java seldom fail attacking persons who lie with their feet uncovered, whenever they can get access; and Gumilla, after mentioning a greater and less species found on the banks of the Oronoque, declares them to be equally greedy after human blood. Persons thus attacked have been known to be near passing from a sound sleep into eternity. The bat is so dexterous a bleeder, as to insinuate its aculeated tongue into a vein without being perceived, and then suck the blood till it is satiated; all the while fanning with its wings, and agitating the air in that hot climate in so pleasing a manner, as to lull the sufferer into a still sounder sleep. It is therefore very unsafe to rest either in the open air, or to leave open any entrance to these dangerous animals: but they do not confine themselves to human blood; for M. Condamine says, that in certain parts of America they have destroyed all the great cattle introduced there by the missionaries. See Plate DX. fig. 3.

2. The *spectrum*, or spectre, with a long nose; large teeth; long, broad, and upright ears: at the end of the nose a long conic erect membrane, bending at the end, and flexible: hair on the body cinereous, and pretty long: wings full of ramified fibres: the membrane extends from hind leg to hind leg; no tail; but from the rump extend three tendons, terminating at the edge of the membrane. By Seba's figure the extent of the wings are two feet two inches; from the end of the nose to the rump, seven inches and an half.

Inhabits South America; lives in the palm-trees; grows very fat; called *vampyre* by M. de Buffon, who supposes it to be the species that sucks human blood: but neither Piso, nor any other writer who mentions the fact, gives the least description of the kind.

3. The *Peruvian* bat hath a head like a pug-dog; large straight-pointed ears; two canine teeth, and two small cutting teeth between each, in each jaw: the tail is inclosed in the membrane which joins to each hind-leg, and is also supported by two long cartilaginous ligaments involved in the membrane: colour of the fur, iron grey: body equal to that of a middle-sized rat: extent of the wings two feet five inches.

4. The *noctule* hath the nose slightly bilobated; ears small and rounded; on the chin a minute verruca; hair reddish ash-colour: length of the rump two inches eight-tenths; tail one inch seven-tenths; extent of wings 13 inches. Inhabits Great Britain and France; flies high in search of food, not skimming near the ground. A gentleman informed Mr Pennant of the following fact relating to those animals, which he was witness to: That he saw taken under the eaves of Queen's College, Cambridge, in one night, 185; the second night, 63; the third night, 2; and that each that was measured had 15 inches extent of wings.

5. The *murinus*, common bat; has a tail: the lips and nose are simple; and the ears are smaller than the head.

It inhabits Europe, and is found in Britain. This animal flies only during the night, living chiefly on moths: when it lights on the ground it is unable to rise again till it has crawled to some height: it remains torpid during winter,

Vessel
||
Veltry.

ter, revives in the beginning of the spring, and comes abroad in the dusk of the evening. This species is two inches and a half long, when full grown, and about nine inches in extent; the fur is of a mouse-colour, tinged with reddish; it generally skims near the ground, with an uneven jerking flight; and often seeking for gnats and other aquatic insects, flies close by the surface of water. It breeds in the summer season, and is preyed on by owls.

Bats are very voracious, if proper food is to be had; and though moths and other insects be their natural and common food, yet if flesh, whether raw or roasted, fresh or corrupted, comes in their way, they devour it with greediness. In this country they appear abroad early in spring, flying about only in the evenings; but are sometimes roused from their torpidity by a warm day or two during winter, and will then venture out in quest of food, but recommence their state of hybernation whenever the cold returns: They retire at the end of summer into caves, ruined houses, or the roofs and eaves of houses, where they remain suspended by the hind legs, and enveloped in their wings, generally in large numbers. Bats may be caught by means of the flower cups of bur-dock, whitened and thrown up in the way of their flight; they are attracted by the whiteness, and the hooks of the bur, sticking to their membranous wings, make them fall to the ground.

VESSEL, a general name given to the different sorts of ships which are navigated on the ocean, or in canals and rivers. It is, however, more particularly applied to those of the smaller kind, furnished with one or two masts. See SHIP.

VESTA, in pagan worship, the same with Cybele. See CYBELE.

VESTA the *Younger*, in pagan worship, the goddess of Fire, was the daughter of Saturn and Cybele, and the sister of Ceres. She was so much in love with chastity, that on Jupiter's ascending the throne and offering to grant whatever she asked, she only desired the preservation of her virginity, which she obtained.—Vesta was not represented in her temple by any image.

VESTALIA, in Roman antiquity, a festival celebrated in honour of the goddess Vesta, on the 5th of the ides of June; that is, on the ninth of the month.

VESTALS, among the ancient Romans, were priestesses of the goddess Vesta, and had the perpetual fire committed to their charge: they were at first only four in number, but afterwards increased to six; and it does not appear that their number ever exceeded six, among whom was one superior to the rest, and called *vestalis maxima*.

The vestals were chosen from six to ten years of age, and obliged to strict continency for 30 years; the first 10 of which were employed in learning the ceremonies of religion, the next 10 in the performance of them, and the 10 last in teaching them to the younger vestals.

The habit of the vestals consisted of an head-dress, called *infula*, which sat close to the head, and from whence hung certain laces called *vitta*; a kind of surplice made of white linen, and over it a purple mantle with a long train to it.

VESTIBLE, in architecture, a kind of entrance into a large building; being an open place before the hall, or at the bottom of the staircase.

VESTRY, a place adjoining to a church, where the vestments of the minister are kept; and also a meeting at such place, consisting of the minister, church-wardens, and chief men of most parishes, who make a parish vestry or meeting. By custom there are select vestries, being a certain number of persons chosen to have the government of

the parish, make rates, and take the accounts of church-wardens, &c.

VESUVIUS, a celebrated volcano of Italy, six miles east from the city of Naples. This mountain has two tops; one of which only goes by the name of *Vesuvius*, the other being now called *Somma*; but Sir William Hamilton is of opinion, that the latter is what the ancients called *Vesuvius*.

The perpendicular height of Vesuvius is only 3700 feet, though the ascent from the foot to the top is three Italian miles. One side of the mountain is well cultivated and fertile, producing great plenty of vines; but the south and west sides are entirely covered with cinders and ashes; while a sulphureous smoke constantly issues from the top, sometimes attended with the most violent explosions of stones, the emission of great streams of lava, and all the other attendants of a most formidable volcano. The first of these eruptions recorded in history took place in the year 79; at which time the two cities of Pompeii and Herculaneum were entirely buried under the stones and ashes thrown out. Incredible mischief was also done to the neighbouring country, and numbers of people lost their lives, among whom was Pliny the Elder.

It is the opinion of the best judges, however, that this eruption was by no means the first that had ever happened. The very streets of those cities which were at that time overwhelmed are said to be partly paved with lava. Since that time 30 different eruptions have been recorded, some of which have been extremely violent. In the year 1538, a mountain, three miles in circumference and a quarter of a mile in perpendicular height, was thrown up in the course of one night. In the year 1766, Sir William Hamilton, ambassador to his Sicilian Majesty, began to observe the phenomena of this mountain; and since that time the public has been favoured with much more exact and authentic accounts of the various changes which have taken place in Vesuvius than what were to be had before.

The first great eruption taken notice of by this gentleman was that of 1767, which, though very violent, was mild in comparison with that of 1538.

From this time (1767) Vesuvius never ceased for ten years to send forth smoke, nor were there many months in which it did not throw out stones, scorix, and cinders; which, increasing to a certain degree, were usually followed by lava; so that from the year 1767 to 1779 there were nine eruptions, some of them very considerable. In the month of August that year, however, an eruption took place, which, for its extraordinary and terrible appearance, may be reckoned among the most remarkable of any recorded concerning this or any other volcano.

During the whole month of July the mountain continued in a state of fermentation. Subterraneous explosions and rumbling noises were heard; quantities of smoke were thrown up with great violence, sometimes with red-hot stones, scorix, and ashes; and towards the end of the month these symptoms increased to such a degree as to exhibit, in the night time, the most beautiful fire-works that can be imagined.

On Thursday 5th August the volcano appeared most violently agitated; a white and sulphureous smoke issued continually and impetuously from its crater, one puff seeming to impel another; so that a mass of them was soon accumulated, to appearance, four times the height and size of the volcano itself. These clouds of smoke were exceedingly white, so that the whole resembled an immense accumulation of bales of the whitest cotton. In the midst of this very white smoke, vast quantities of stones, scorix, and ashes, were thrown up to the height of 2000 feet; and a quantity

Vesuvius.

General description of the mountain.

Account of the first eruption recorded in history.

Of the eruption in 1767.

4
Nine eruptions from 1767 to 1779.

5
Account of the great eruption in 1779.

Vesuvius. of liquid lava, seemingly very heavy, was lifted up just high enough to clear the rim of the crater, and take its way down the sides of the mountain. This lava, having run violently for some hours, suddenly ceased, just before it had reached the cultivated parts of the mountain, near four miles from the spot whence it issued. The heat, all this day, was intolerable at the towns of Somma and Ottaiano; and was sensibly felt at Palma and Lauri, which are much farther off. Reddish ashes fell so thick on the two former, that the air was darkened, so that objects could not be distinguished at the distance of ten feet. Long filaments of a vitrified matter, like spun glass, were mixed, and fell with these ashes; several birds in cages were suffocated, and the leaves of the trees in the neighbourhood of Somma were covered with white and very corrosive salt.

6
Extraordi-
nary effu-
sion of fire
by the ap-
proach of
stormy
clouds.

About 12 at night, on the 7th, the fermentation of the mountain seemed greatly to increase. Our author was watching the motions of the volcano from the mole at Naples, which has a full view of it. Several glorious picturesque effects had been observed from the reflection of the deep red fire within the crater of Vesuvius, and which mounted high amongst those huge clouds on the top of it: when a summer storm, called in that country a *tropea*, came on suddenly, and blended its heavy watery clouds with the sulphureous and mineral ones, which were already like so many other mountains piled up on the top of the volcano. At this moment a fountain of fire was shot up to an incredible height, casting so bright a light, that the smallest objects were clearly distinguishable at any place within six miles or more of Vesuvius. The black stormy clouds, passing swiftly over, and at times covering the whole or a part of the bright column of fire, at other times clearing away and giving a full view of it, with the various tints produced by its reverberated light on the white clouds above in contrast with the pale flashes of forked lightning that attended the *tropea*, formed such a scene as no power of art can express. One of his Sicilian majesty's gamekeepers, who was out in the fields near Ottaiano whilst this storm was at its height, was surprised to find the drops of rain scald his face and hands; a phenomenon probably occasioned by the clouds having acquired a great degree of heat in passing through the above mentioned column of fire.

7
Immense
fountain of
lava
thrown up
by Vesu-
vius.

On the 8th the mountain was quiet till towards six o'clock in the evening, when a great smoke began to gather over its crater; and about an hour after a rumbling subterraneous noise was heard in the neighbourhood of the volcano; the usual throws of red-hot stones and scorix began and increased every instant. The crater, viewed through a telescope, seemed much enlarged by the violence of last night's explosions, and the little mountain on the top was entirely gone. About nine o'clock a most violent report was heard at Portici and its neighbourhood, which shook the houses to such a degree as made the inhabitants run out into the streets. Many windows were broken, and walls cracked by the concussion of the air on this occasion, though the noise was but faintly heard at Naples. In an instant a fountain of liquid transparent fire began to rise, and gradually increasing, arrived at last at the amazing height of ten thousand feet and upwards. Puffs of smoke, as black as can possibly be imagined, succeeded one another hastily, and accompanied the red-hot, transparent, and liquid lava, interrupting its splendid brightness here and there by patches of the darkest hue. Within these puffs of smoke, at the very moment of emission, a bright but pale electrical fire was observed playing briskly about in zig-zag lines. The wind was south-west, and, though gentle, was sufficient to carry these puffs of smoke out of the column of fire; and a collection of them by degrees formed a black and extensive cur-

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tain behind it; in other parts of the sky it was perfectly clear, and the stars bright. The fiery fountain, of such immense magnitude, on the dark ground just mentioned, made the finest contrast imaginable; and the blaze of it reflected from the surface of the sea, which was at that time perfectly smooth, added greatly to this sublime view.

The lava, mixed with stones and scorix, having risen to the amazing height already mentioned, was partly directed by the wind towards Ottaiano, and partly falling, still red-hot and liquid, upon the top of Vesuvius, covered its whole cone, part of that of the summit of Somma, and the valley between them. The falling matter, being nearly as inflamed and vivid as that which was continually issuing fresh from the crater, formed with it one complete body of fire, which could not be less than two miles and a half in breadth, and of the extraordinary height above mentioned, cast a heat to the distance of at least six miles round. The brushwood on the mountain of Somma was soon in a blaze, and the flame of it being of a different colour from the deep red of the matter thrown out by the volcano, and from the silvery blue of the electrical fire, still added to the contrast of this most extraordinary scene.

The black cloud, increasing greatly, once bent towards Naples, and threatened the city with speedy destruction; for it was charged with electrical fire, which kept constantly darting about in bright zig-zag lines. This fire, however, rarely quitted the cloud, but usually returned to the great column of fire whence it proceeded; though once or twice it was seen to fall on the top of Somma, and set fire to some dry grass and bushes. Fortunately the wind carried back the cloud just as it reached the city, and had begun to occasion great alarm. The column of fire, however, still continued, and diffused such a strong light, that the most minute objects could be discerned at the distance of ten miles or more from the mountain. Mr Morris informed our author, that at Sorrento, which is twelve miles distant from Vesuvius, he read the title-page of a book by that volcanic light.

All this time the miserable inhabitants of Ottaiano were involved in the utmost distress and danger by the showers of stones which fell upon them, and which, had the eruption continued for a longer time, would most certainly have reduced their town to the same situation with Herculaneum and Pompeii. The mountain of Somma, at the foot of which the town of Ottaiano is situated, hides Vesuvius from the view of its inhabitants; so that till the eruption became considerable it was not visible to them. On Sunday night, when the noise increased, and the fire began to appear above the mountain of Somma, many of the inhabitants flew to the churches, and others were preparing to quit the town, when a sudden and violent report was heard; soon after which they found themselves involved in a thick cloud of smoke and ashes: a horrid clashing noise was heard in the air, and presently fell a vast shower of stones and large pieces of scorix, some of which were of the diameter of seven or eight feet, which must have weighed more than a hundred pounds before they were broken, as some of the fragments which Sir William Hamilton found in the streets still weighed upwards of 60 pounds. When these large vitrified masses either struck against one another in the air, or fell on the ground, they broke in many pieces, and covered a large space of ground with vivid sparks of fire, which communicated their heat to every thing that was combustible. These masses were formed of the liquid lava; the exterior parts of which were become black and porous by cooling in their fall through such a vast space; whilst the interior parts, less exposed, retained an extreme heat, and were perfectly red.

In an instant the town and country about it was on fire in

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many

8
Distress of
the inhabi-
tants of
Ottaiano.

Vesuvius. many parts, for there were several straw huts in the vineyards, which had been erected for the watchmen of the grapes; all of which were burnt. A great magazine of wood in the heart of the town was all in a blaze; and had there been much wind, the flames must have spread universally, and all the inhabitants would have been burnt in their houses; for it was impossible for them to stir out. Some, who attempted it with pillows, tables, chairs, the tops of wine casks, &c. on their heads, were either knocked down or soon driven back to their close quarters under arches and in the cellars of their houses. Many were wounded, but only two persons died of their wounds.

To add to the horror of the scene, incessant volcanic lightning was whirling about the black cloud that surrounded them, and the sulphureous smell and heat would scarcely allow them to draw their breath. In this dreadful situation they remained about 25 minutes, when the volcanic storm ceased all at once, and Vesuvius remained sullen and silent.

9
Vast quantity of electric matter in the air.

Some time after the eruption had ceased, the air continued greatly impregnated with electrical matter. The duke of Cottofiano told our author, that having, about half an hour after the great eruption had ceased, held a Leyden bottle, armed with a pointed wire, out at his window at Naples, it soon became considerably charged. But whilst the eruption was in force, its appearance was too alarming to allow one to think of such experiments.—He was informed also by the prince of Monte Mileto, that his son, the duke of Popoli, who was at Monte Mileto the 8th of August, had been alarmed by the shower of cinders that fell there; some of which he had sent to Naples weighing two ounces; and that stones of an ounce weight had fallen upon an estate of his ten miles farther off. Monte Mileto is about 30 miles from the volcano. The Abbé Cagliani also related, that his sister, a nun in a convent at Manfredonia, had written to inquire after him, imagining that Naples must have been destroyed, when they, at so great a distance, had been alarmed by a shower of ashes which fell on the city at eleven o'clock at night, so much as to open all the churches, and go to prayers. As the great eruption happened at nine o'clock, these ashes must have travelled an hundred miles in the space of two hours.

10
Damage done by the irruption at Ottaviano.

Nothing could be more dismal than the appearance of Ottaviano after this eruption. The houses were unroofed, half buried under the black scoriae and ashes; all the windows towards the mountain were broken, and some of the houses themselves burnt; the streets choked up with ashes, in some narrow places not less than four feet thick; and a few of the inhabitants who had just returned, were employed in clearing them away, and piling them up in hillocks, to get at their ruined houses. The palace of the prince of Ottaviano is situated on an eminence above the town, and nearer the mountain. The steps leading up to it were deeply covered with volcanic matter; the roof was totally destroyed, and the windows broken, but the house itself, being strongly built, had not suffered much.

11
Vast fragments of lava thrown out.

An incredible number of fragments of lava were thrown out during the eruption, some of which were of immense magnitude. The largest measured by Sir William Hamilton was 108 feet in circumference and 17 in height. This was thrown at least a quarter of a mile clear of the mouth of the volcano. Another, 66 feet in circumference and 19 in height, being nearly of a spherical figure, was thrown out at the same time, and lay near the former. This last had the marks of being rounded, nay almost polished, by continual rolling in torrents or on the sea shore. Our author conjectures that it might be a spherical volcanic salt, such as that of 45 feet in circumference mentioned by M. de St Fond, in his Treatise of Extinguished Volcanoes. A

third of 16 feet in height and 92 in circumference was thrown much farther, and lay in the valley between Vesuvius and the Hermitage. It appeared also, from the large fragments that surrounded this mass, that it had been much larger while in the air.

Vesuvius continued to emit smoke for a considerable time after this great eruption, so that our author was apprehensive that another would soon ensue; but from that time nothing comparable to the above has taken place. From the time of this great eruption to the year 1786 our author kept an exact diary of the operations of Vesuvius, with drawings, showing, by the quantity of smoke, the degree of fermentation within the volcano. The operations of the subterraneous fire, however, appear to be very capricious and uncertain. One day there will be the appearance of a violent fermentation, and the next every thing will be calmed; but whenever there has been a considerable ejection of scoriae and cinders, it has been a constant observation, that the lava soon made its appearance, either by boiling over the crater, or forcing its way through the crevices in the conical part of the mountain. An eruption took place in the month of November 1784, and continued for some time, but without being accompanied with any extraordinary circumstance.

Vetch
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Viburnum.

Since that time there have been no remarkable eruptions of this volcano, at least none that have been properly authenticated; though, indeed, Sir William Hamilton observes, that the inhabitants of Naples in general pay so little attention to the operations of this volcano, that many of its eruptions pass unnoticed by at least two-thirds of them.

12
Eruption in 1784.

13
State of Vesuvius to the present time.

VETCH, in botany. See VICIA.

VETERAN, among the ancient Romans, an appellation given to a soldier grown old in the service, or who had made a certain number of campaigns.

VETERINARY ART. See FARRIERY.

VEXILLUM, in botany; the upper petal of a pea-bloom, or butterfly-shaped flower, which is generally larger than any of the others.

VIALES, in mythology, a name given among the Romans to the gods who had the care and guard of the roads and highways.

VIATICUM, in Roman antiquity, an appellation given in common to all officers of any of the magistracies; as *licitors*, *accensi*, *scribes*, *criers*.

VIBEX, is sometimes used, by physicians, for a black and blue spot in the skin occasioned by an afflux or extravasation of blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, as a pendulum.

VIBURNUM, in botany; a genus of plants of the class *pentandria*, order *trigynia*, and in the natural system arranged under the 43d order, *dumose*. The calyx is quinquepartite and above; the corolla divided into five lacinae; the fruit a monospermous berry. There are 19 species; two of which, the *lantana* and *opulus*, are natives of Britain. 1. The *lantana*, common viburnum, wayfaring, or pliant meally tree, rises with a woody stem, branching twenty feet high, having very pliant shoots covered with a lightish-brown bark; large heart-shaped, veined, serrated leaves, white and hoary underneath; and the branches terminated by umbels of white flowers, succeeded by bunches of red berries, &c. 2. The *opulus*, or gelder-rose; consisting of two varieties, one with flat flowers, the other globular. The former grows eighteen or twenty feet high, branching opposite, of an irregular growth, and covered with a whitish bark; large lobated or three-lobed leaves on glandulose foot-stalks, and large flat umbels of white flowers at the ends of the branches, succeeded by red berries. The latter grows fifteen

Vicar
||
Victim.

or eighteen feet high, branching like the other, garnished with large lobated or three-lobed leaves, on glandular foot-stalks; and large globular umbels of white flowers at the ends of the branches, in great abundance. This tree when in bloom exhibits a singularly fine appearance: the flowers, though small, are collected numerously into large globular umbels round like a ball; hence it is sometimes called *snow-ball-trees*. 3. The *tinus*, common laurustinus, or evergreen viburnum; grows eight or ten feet high or more, branching numerously from the bottom upwards, assuming a close bushy growth, with the branches somewhat hairy and glandulous; very closely garnished with oval, wholly entire leaves, of a strong green colour, placed in pairs opposite; and whitish and red flowers, collected numerously in large umbellate clusters all over the plant, at the sides and ends of the branches, from January until March or April, exhibiting a most beautiful appearance. There are a great many varieties. All the different species of viburnum, both deciduous and evergreen kinds, being of the tree kind, are woody and durable in root, stem, and branches. They may all be propagated by layers; and are of such hardy temperate, as to grow freely in the open ground all the year, in shrubberies, and other hardy plantations.

VICAR, a person appointed as deputy to another, to perform his functions in his absence, and under his authority.

VICAR, in the canon-law, denotes a priest of a parish, the predial tithes whereof are impropriated or appropriated; that is, belong either to a chapter, religious house, &c. or to a layman who receives them, and only allows the vicar the small tithes, or a convenient salary. See the article *PARSON and Vicar*.

VICE, in ethics, is ordinarily defined an elective habit, denoting either an excess or defect from the just medium wherein virtue is placed.

VICE, in smithery and other arts conversant in metals, a machine or instrument serving to hold fast any thing they are at work upon, whether it is to be beat, filed, or rivetted.

VICE is also used in the composition of divers words to denote the relation of something that comes instead or in the place of another; as vice-admiral, vice-chancellor, &c. are officers who take place in the absence of admirals, &c.

VICEROY, a governor of a kingdom, who commands in the name and instead of a king, with full and sovereign authority.

VICIA, in botany: A genus of plants of the class *diadelphia*, and order of *detandria*; and in the natural system arranged under the 32d order, *Papilionaceae*. The stigma is bearded transversely on the lower side. There are 20 species, 7 of which are natives of Britain. The most important of these are, 1. The *sativa*, common vetch, or tare. The stalks are round, weak, branched, about two feet long. Pinnæ five or seven pair, a little hairy, notched at the end. Stipulæ dentated. Flowers light and dark purple, on short pedicles, generally two together; pods erect; seeds black. It is known to be an excellent fodder for horses. 2. The *cracca*, tufted vetch. It has a stem branched, three or four feet long. Leaves pinnated; pinnæ generally ten or twelve pair, lance-shaped, downy. Stipulæ entire. Flowers purple, numerous, pendulous, in imbricated spikes. It is also reckoned an excellent fodder for cattle. 3. The *faba*, or common garden bean. It is a native of Egypt. It is too well known to require description.

VICISSITUDE, the regular succession of one thing after another; as the vicissitude of day and night, of the seasons, &c.

VICTIM, denotes a sacrifice offered to some deity, of

a living creature, as a man or beast, which is slain to appease his wrath, or to obtain some favour.

VICTOR (Sextus Aurelius), a Roman historian, who flourished under the emperors Constantius and Julian; as we learn from many passages in his own writings, and also from Ammianus Marcellinus. This historian relates, that Constantius made him consul, and honoured him with a brazen statue, on account of his excellent qualifications; although, as he owns of himself, he was born in an obscure village, and of poor and illiterate parents. It is commonly believed that he was an African; it is certain, that he dwells much upon the praises of that country, which he calls the glory of the earth; *decus terrarum*. Two books of his are extant in the historical way: one *De viris illustribus urbis Romæ*; the other, *De Caesaribus*; to which is prefixed *Libellus de origine gentis Romanæ*. The whole makes an abridged history of Rome, from its foundation down to the reign of Julian inclusive.

VICTORY, the overthrown or defeat of an enemy in war or combat.

VICTORY, in pagan worship, is represented by Hesioid as the daughter of Styx and Pallas; and Varro calls her the daughter of Heaven and Earth. The Romans erected a temple to her, where they prayed to the gods to give success to their arms. They painted her in the form of a woman, clad in cloth of gold. In some medals, she is represented with wings flying through the air, holding a laurel crown in one hand and a palm in the other; but in other medals, she is seen standing upon a globe, with the same crown and branch of palm.

VIDA (Marcus Hieronymus), bishop of Alva, in Mountferrat, and one of the most excellent Latin poets that have appeared since the Augustan age, was born at Cremona in 1470. Having distinguished himself by his learning and taste for literature, he was made bishop of Alva in 1552. After continuing two years with pope Clement VII. at Rome, he went to reside upon his see; where, for 30 years, he performed all the offices of a good bishop and a good man; and though he was mild, gentle, and full of goodness, he was so far from wanting spirit, that when the city of Alva was besieged by the French, he used all possible means to prevent its being given up, by strenuously exhorting the people, and, when provisions were scarce, by supplying them at his own expence. His poetical, and poem on the silk-worm, pass for his masterpiece; his poem on the game of chess is also greatly admired. He also wrote hymns, eclogues, and a poem entitled *Christiados* in six books; all which are in Latin, and have gained him a great reputation. His works in prose consist of dialogues, synodical constitutions, letters, and other pieces. He died in 1566, soon after his being made bishop of Cremona.

VIENNA, the capital of the circle of Austria, in Germany, and of the whole German empire, is the place where the emperor resides. The city itself is not of very great extent; nor can it be enlarged, it being limited by a very strong fortification; but it is very populous. The streets, in general, are narrow, and the houses built high. Some of the public buildings are magnificent; but they appear externally to no great advantage, on account of the narrowness of the streets. The chief of them are the imperial palace, the library, and the museum; the palaces of the princes Lichtenstein, Eugene, &c. Vienna was twice ineffectually besieged by the Turks; namely, in 1589 and 1683. At the latter period, the siege was raised by John Sobieski, king of Poland, who totally defeated the Turkish army before the walls of this place. There is no great danger that Vienna will ever again be sub-

Vicor
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Vienna.

Vienna,
Vigil.

jected to the inconveniences of a siege. Yet, in case this should happen, a measure has been taken, which will prevent the necessity of destroying the suburbs; namely, no houses without the walls are allowed to be built nearer to the glacis than 600 yards; so that there is a circular field of that breadth all round the town, which, exclusive of the advantage above-mentioned, has a very beautiful and salutary effect. These magnificent suburbs, and the town together, are said to contain above 300,000 inhabitants; yet the former are not near so populous, in proportion to their size, as the town; because many houses in the suburbs have extensive gardens belonging to them, and many families, who live during the winter within the fortifications, spend the summer in the suburbs. The cathedral is built of free-stone, is 114 yards long, and 48 broad, and the steeple is 447 feet high. Instead of a weather-cock there was a Turkish crescent, in memory of the siege in 1589; but, after the second siege in 1683, they changed it for a golden cross, which three months after was thrown down by a storm. At present there is a black spread eagle, over which is a gilded cross. Joining to this church is the archbishop's palace, the front of which is very fine. The university had several thousand students, who, when this city was besieged, mounted guard, as they did also in 1741. Beside this, there is the academy of Lower Austria; and the archducal library is much frequented by foreigners, as it contains above 100,000 printed books, and 10,000 manuscripts. The academy of painting is remarkable for the fine pictures it produces. The archducal treasury, and a cabinet of curiosities of the house of Austria, are great rarities. The inhabitants, in general, live in a splendid manner; and people of distinction have all sorts of wines at their tables, which they are very free with to foreigners. There is a sort of harbour on the Danube, where there are magazines of naval stores, and ships have been fitted out to serve on that river against the Turks. Vienna is an archbishop's see. It is seated at the place where the river Vienna, or Wien, falls into the Danube, 30 miles west of Presburgh, 350 north-north-east of Rome, 520 south-east by south of Amsterdam, 565 east of Paris, and 680 east-south-east of London. E. Long. 16. 28. N. Lat. 48. 13.

VIGIL, in church-history, is the eve or next day before any solemn feast; because then Christians were wont to watch, fast, and pray, in their churches.

VIGILS of Plants, a term under which botanists comprehend the precise time of the day in which the flowers of different plants open, expand, and shut.

As all plants do not flower in the same season, or month; in like manner, those which flower the same day, in the same place, do not open and shut precisely at the same hour. Some open in the morning, as the lip flowers, and compound flowers with flat spreading petals; others at noon, as the mallows; and a third set in the evening, or after sunset, as some geraniums and opuntias: the hour of shutting is equally determined. Of those which open in the morning, some shut soon after, while others remain expanded till night.

The hours of opening, like the time of flowering, seem to vary, according to the species of the plant, the temperature of the climate, and that of the season. Flowers, whose extreme delicacy would be hurt by the strong impressions of an ardent sun, do not open till night; those which require a moderate degree of heat to elevate their juices; in other words, whose juices do not rise but in the morning or evening, do not expand till then; whilst those which need a more lively heat for the same purpose, expand at noon, when the sun is in his meridian strength. Hence it is, that the heat of the air being greater betwixt the tropics than elsewhere, plants which are transported from those climates into

the cold or temperate climates of Europe, expand their flowers much later than in their native soil. Thus, a flower which opens in summer at six o'clock in the morning at Senegal, will not open at the same season in France and England till eight or nine, nor in Sweden till ten.

Linnæus distinguishes by the general name of *solar* (*flores solares*) all those flowers which observe a determinate time in opening and shutting. These flowers are again divided, from certain circumstances, into three species, or kinds:

Equinoctial flowers (*flores æquinoctiales*) are such as open and shut at all seasons, at a certain fixed or determinate hour.

Tropical flowers (*flores tropici*) are such whose hour of opening is not fixed at all seasons, but accelerated or retarded according as the length of the day is increased or diminished.

Meteorous flowers (*flores meteorici*) are such whose hour of expansion depends upon the dry or humid state of the air, and the greater or less pressure of the atmosphere. Of this kind is the Siberian sow-thistle, which shuts at night if the ensuing day is to be clear and serene, and opens if it is to be cloudy and rainy. In like manner the African marigold, which in dry serene weather opens at six or seven in the morning, and shuts at four o'clock in the afternoon, is a sure indication that rain will fall during the course of the day, when it continues shut after seven.

VIGO, a sea-port town of Spain, in Galicia, with an old castle and a fort. It is seated in a fertile country by the sea-side. It was rendered famous by a sea-fight between the confederate fleet commanded by Sir George Rook, and a squadron of French men of war, while the duke of Ormond with a body of land-forces drove the Spaniards from the castles which defended the harbour. Admiral Hopson having with infinite danger broke through the boom made across the mouth of the harbour, the English took four galleons and five large men of war, and the Dutch five galleons and one man of war. Four galleons, with 14 men of war, were destroyed, with abundance of plate and other rich effects. W. Long. 8. 21. N. Lat. 42. 3.

VILLA FRANCA, the name of several towns; one in Piedmont, three miles east of Nice; another of Catalonia, 18 miles west of Barcelona; a third, the capital of St Michael, one of the Azores; and a fourth, a town of Estremadura in Spain, 57 miles south-east of Salamanca.

VILLAGE, an assemblage of houses inhabited chiefly by peasants and farmers, and having no market, whereby it is distinguished from a town. The word is French, formed of *vil*, or *vilis*, "low, mean, contemptible:" or rather, from the Latin *villa*, a country-house or farm.

VILLAIN, or VILLEIN, in our ancient customs, denotes a man of servile or base condition, viz. a bond-man or servant.

VILLARS (Lewis Hector, duke de), marshal of France, grandee of Spain, &c. and a very brave general, was the son of Peter marquis de Villars, of a noble and ancient family. He was at first aid-de-camp to marshal de Bellefons, his cousin; and distinguished himself in several sieges and battles till the year 1702, when having obtained the victory at Fredlinghem from the prince of Baden, he was made marshal of France. The marshal de Villars took the fort of Kell the year following, and gained a battle at Hochstet in concert with the elector of Bavaria. In 1707 he forced the lines of Stollhoffen, and raised large contributions from the enemy: but in 1709, he, in conjunction with marshal Boufflers, was entirely defeated by the duke of Marlborough, at the battle of Malplaquet, when marshal Villars was wounded at the beginning of the action. In 1712 he gained much glory by forcing the intrenchments at Denain on the Scheld; which was followed by the taking of Marchiennes, Douay, Bouchain, Landau, Friburg, &c. and by the peace concluded at Rastat between the emperor and France

Vigo
Villars.

Villénage. France in 1714. The marshal de Villars, who had been plenipotentiary at the treaty of Rastat, was made president of the council of war in 1715, then counsellor of the regency, and minister of state. In 1733, he was nominated to command in Italy under the king of Sardinia, and the French king declared him marshal-general of his camps and armies; a title which had not been granted to any one since the marshal Turenne, who appears to have been the first who was ever honoured with it. The marshal de Villars made himself master of Pifighitona, Milan, Novara, and Tortona. But having opened the following campaign, he fell sick, and died at Turin, in 1734, aged 82. The Memoirs of M. de Villars have been published in Holland, the first volume of which was written by himself.

VILLENAGE, in law. The folk-land or estates held in villénage, was a species of tenure neither strictly feudal, Norman, or Saxon; but mixed and compounded of them all; and which also, on account of the heriots that usually attend it, may seem to have somewhat Danish in its composition. Under the Saxon Government there were, as Sir William Temple speaks, a sort of people in a condition of downright servitude, used and employed in the most servile works, and belonging, both they, their children, and effects, to the lord of the soil, like the rest of the cattle or stock upon it. These seem to have been those who held what was called the *folkland*, from which they were removeable at the lord's pleasure. On the arrival of the Normans here, it seems not improbable, that they, who were strangers to any other than a feudal state, might give some sparks of enfranchisement to such wretched persons as fell to their share, by admitting them, as well as others, to the oath of fealty; which conferred a right of protection, and raised the tenant to a kind of estate superior to downright slavery, but inferior to every other condition. This they called *villénage*, and the tenants *villeins*.

These villeins, belonging principally to lords of manors, were either villeins *regardant*, that is, annexed to the manor or land; or else they were *in gross*, or at large, that is, annexed to the person of the lord, and transferable by deed from one owner to another. They could not leave their lord without his permission; but, if they ran away, or were purloined from him, might be claimed and recovered by action, like beasts or other chattels. They held indeed small portions of land by way of sustaining themselves and families: but it was at the mere will of the lord, who might dispossess them whenever he pleased; and it was upon villein services, that is, to carry out dung, to hedge and ditch the lord's demesnes, and any other the meanest offices: and their services were not only base, but uncertain both as to their time and quantity.

A villein could acquire no property either in lands or goods: if he purchased either, the lord might seize them to his own use; unless he contrived to dispose of them again before the lord had seized them, for the lord had then lost his opportunity.

In many places also a fine was payable to the lord, if the villein presumed to marry his daughter to any one without leave from the lord: and, by the common law, the lord might also bring an action against the husband for damages in thus purloining his property. For the children of villeins were also in the same state of bondage with their parents; whence they were called in Latin *nativi*, which gave rise to the female appellation of a villein, who was called a *neife*. In case of a marriage between a freeman and a neife, or a villein and a freewoman, the issue followed the condition of the father, being free if he was free, and villein if he was villein; contrary to the maxim of the civil law, that *partus sequitur ventrem*. But no bastard could be born a villein,

because by another maxim of our law he is *nullius filius*; and as he can gain nothing by inheritance, it were hard that he should lose his natural freedom by it. The law, however, protected the persons of villeins against atrocious injuries of the lord: for he might not kill or maim his villein; though he might beat him with impunity.

Villeins might be enfranchised by manumission. In process of time they gained considerable ground on their lords; and in particular strengthened the tenure of their estates to that degree, that they came to have in them an interest in many places full as good, in others better than their lords. For the good-nature and benevolence of many lords of manors having, time out of mind, permitted their villeins and their children to enjoy their possessions without interruption, in a regular course of descent, the common law, of which custom is the life, now gave them title to prescribe against their lords; and, on performance of the same services, to hold their lands, in spite of any determination of the lord's will. For though in general they are still said to hold their estates at the will of the lord, yet it is such a will as is agreeable to the custom of the manor; which customs are preserved and evidenced by the rolls of the several courts-baron in which they are entered, or kept on foot by the constant immemorial usage of the several manors in which the lands lie. And as such tenants had nothing to show for their estates but these customs, and admissions in pursuance of them, entered on those rolls, or the copies of such entries witnessed by the steward, they now began to be called *tenants by copy of court-roll*, and their tenure itself a *copyhold*.

Privileged VILLENAGE, a species of tenure otherwise called *villein-focage*. See **TENURE**.

Ancient demesne consists of those lands or manors which, though now perhaps granted out to private subjects, were actually in the hands of the crown in the time of Edward the Confessor, or William the Conqueror; and so appear to have been, by the great survey in the exchequer, called *doomsday-book*. The tenants of these lands, under the crown, were not all of the same order or degree. Some of them, as Britton testifies, continued for a long time pure and absolute villeins, dependent on the will of the lord; and common copyholders in only a few points. Others were in a great measure enfranchised by the royal favour; being only bound in respect of their lands to perform some of the better sort of villein-services: but those determinate and certain; as, to plough the king's land for so many days, to supply his court with such a quantity of provisions, and the like; all of which are now changed into pecuniary rents; and in consideration hereof they had many immunities and privileges granted to them; as, to try the right of their property in a peculiar court of their own, called a *court of ancient demesne*, by a peculiar process denominated a writ of right close: not to pay toll or taxes; not to contribute to the expences of knights of the shire; not to be put on juries, and the like.

These tenants therefore, though their tenure be absolutely copyhold, yet have an interest equivalent to a freehold: for though their services were of a base and villénous original, yet the tenants were esteemed in all other respects to be highly privileged villeins; and especially for that their services were fixed and determinate, and that they could not be compelled (like pure villeins) to relinquish those tenements at the lord's will, or to hold them against their own: *et ideo* (says Bracton) *dicuntur liberi*.

Lands holding by this tenure are therefore a species of copyhold, and as such preserved and exempted from the operation of the statute of Charles II. Yet they differ from common copyholds, principally in the privileges before-mentioned:

Villi,
Villiers.

tioned: as also they differ from freeholders by one especial mark and tincture of villenage, noted by Bracton, and remaining to this day; *viz.* that they cannot be conveyed from man to man by the general common-law conveyances of feoffment, and the rest; but must pass by surrender to the lord or his steward, in the manner of common copyholds: yet with this difference, that, in the surrenders of these lands in ancient demesne, it is not used to say, "to hold at the will of their lord," in their copies; but only, "to hold according to the custom of the manor."

VILLI, among botanists, a kind of down like short hair, with which some trees abound.

VILLIERS (George duke of Buckingham), an ingenious and witty nobleman, whose mingled character rendered him at once the ornament and disgrace, the envy and ridicule, of the court he lived in, was son to that famous statesman and favourite of king Charles I. who lost his life by the hands of lieutenant Felton. He was born in 1627, the year before the fatal catastrophe of his father's death. The early parts of his education he received from various domestic tutors, after which he was sent to the university of Cambridge. Having here completed a course of studies, he, with his brother lord Francis, went abroad under the care of one Mr Aylebury.—Upon his return, which was not till after the breaking out of the civil wars, the king being at Oxford, his grace repaired thither, was presented to his majesty, and entered of Christ-church college. Upon the decline of the king's cause, he attended prince Charles into Scotland, and was with him at the battle of Worcester in 1661; after which, making his escape beyond sea, he again joined him, and was soon after, as a reward for this attachment, made knight of the garter.

Desirous, however, of retrieving his affairs, he came privately to England; and in 1657 married Mary, the daughter and sole heiress of Thomas lord Fairfax, through whose interest he recovered the greatest part of the estate he had lost, and the assurance of succeeding to an accumulation of wealth in the right of his wife.

We do not find, however, that this step lost him the royal favour; for after the restoration, at which time he is said to have possessed an estate of L. 20,000 *per annum*, he was made one of the lords of the bed-chamber, called to the privy-council, and appointed lord-lieutenant of Yorkshire and master of the horse. All these high posts, however, he lost again in the year 1666. For having been refused the post of president of the north, he became disaffected to the king; and it was discovered that he had carried on a secret correspondence by letters and other transactions with one Dr Heydon, tending to raise mutinies among his majesty's forces, particularly in the navy, to stir up sedition among the people, and even to engage persons in a conspiracy for the seizing the tower of London. Matters were ripe for execution; and an insurrection, at the head of which the duke was openly to have appeared, was on the very eve of breaking out, when it was discovered by means of some agents whom Heydon had employed to carry letters to the duke. The detection of this affair so exasperated the king, who knew Buckingham to be capable of the blackest designs, that he immediately ordered him to be seized; but the duke finding means, having defended his house for some time by force, to make his escape, his majesty struck him out of all his commissions, and issued a proclamation requiring his surrender by a certain day.

This storm, however, did not long hang over his head; for, on his making a humble submission, king Charles, who was far from being of an implacable temper, took him again into favour, and the very next year restored him both to the privy-council and bed-chamber. But the duke's dispo-

sition for intrigue and machination could not long lie idle; for having conceived a resentment against the duke of Ormond for having acted with some severity against him in regard to the last-mentioned affair, he, in 1670, was supposed to be concerned in an attempt made on that nobleman's life by the same Blood who afterwards endeavoured to steal the crown. Their design was to have conveyed the duke to Tyburn, and there to have hanged him; and so far did they proceed towards the putting it in execution, that Blood and his son had actually forced the duke out of his coach in St James's Street, and carried him away beyond Devonshire house, Piccadilly, before he was rescued from them.

It does not appear, however, that this transaction hurt the duke's interest at court; for in 1671 he was installed chancellor of the university of Cambridge, and sent ambassador to France. Here he was very nobly entertained by Louis XIV. and presented by that monarch at his departure with a sword and belt set with jewels, to the value of 40,000 pistoles; and the next year he was employed in the second embassy to that king at Utrecht. However, in June 1674, he resigned the chancellorship of Cambridge, and about the same time became a zealous partizan and favourer of the Nonconformists. On the 16th of February 1676, his grace, with the earls of Salisbury and Shaftesbury and lord Warton, were committed to the Tower by order of the house of lords, for a contempt in refusing to retract the purport of a speech which the duke had made concerning a dissolution of the parliament. This confinement did not last long; yet we find no material transaction of this nobleman's life recorded after it, till the time of his death, which happened in 1687. Wood tells us that he died at his house in Yorkshire; but Mr Pope, who must certainly have had very good information, and it is to be imagined would not have dared to advance an injurious falsehood of a person of his rank, has, in his epistle to lord Bathurst, given us a most affecting account of the death of this ill-starred nobleman, whom, after having been master of near L. 50,000 *per annum*, he describes as reduced to the deepest distress by his vice and extravagance, and breathing his last moments in a mean apartment at an inn.

As to his personal character, it is impossible to say any thing in its vindication; for though his severest enemies acknowledge him to have possessed great vivacity and a quickness of parts peculiarly adapted to the purposes of ridicule, yet his warmest advocates have never attributed to him a single virtue. His generosity was profuseness, his wit malevolence, the gratification of his passions his sole aim thro' life, his very talents caprice, and even his gallantry the mere love of pleasure. But it is impossible to draw his character with equal beauty, or with more justice, than in that given of him by Dryden, in his *Abfalom* and *Achitophel*, under the name of *Zimri*, to which the reader is referred.

As a writer, however, he stands in a quite different point of view. There we see the wit, and forget the libertine.—His poems, which indeed are not very numerous, are capital in their kind; but what will immortalize his memory while language shall be understood, or true wit relished, is his celebrated comedy of *The Rehearsal*.

VILLOSE, or VILLOUS, something abounding with villi or fibres like short hair; such is one of the coats of the stomach.

VINCA, in botany: A genus of plants of the class *pentandria*, and order of *monogynia*; and in the natural system arranged under the 30th order, *Contortæ*. The corolla is twisted: there are two erect follicles; the seeds are naked. There are five species; only two of which are natives of Britain:

Villiers
Vinca.

St Vincent. Britain: 1. The *major*, great periwinkle. It has a woody, erect stem; leaves broader and sharper pointed; pedicles of the flowers straight, and calyx as long as the tube: otherwise like the former. 2. The *minor*, small periwinkle, has a woody, creeping, slender, crooked stem; leaves long, oval, entire, pointed, opposite, glossy. Flowers single, on long curved pedicles from the axæ of the leaves, which are large and blue.

St VINCENT, one of the windward Caribbee islands, which received its name from being discovered on the 22d of January, the feast of that Saint. It is inhabited by a race of people, of whom Dr Robertson gives this account: "There is a great distinction in character between the Caribbees and the inhabitants of the larger islands. The former appear manifestly to be a separate race. Their language is totally different from that of their neighbours in the large islands. They themselves have a tradition that their ancestors came originally from some part of the continent, and having conquered and exterminated the ancient inhabitants, took possession of their lands and of their women. Hence they call themselves Banaree, which signifies a man come from beyond sea. Accordingly, the Caribbees still use two distinct languages, one peculiar to the men, and the other to the women. The language of the men has nothing common with that spoken in the large islands. The dialect of the women considerably resembles it. This strongly confirms the tradition which I have mentioned. The Caribbees themselves imagine that they were a colony from the Galibis, a powerful nation of Guiana in South America. But as their fierce manners approach nearer to those of the people in the northern continent, than to those of the natives of South America, and as their language has likewise some affinity to that spoken in Florida, their origin should be deduced rather from the former than from the latter. In their wars, they still preserve their ancient practice of destroying all the males, and preserving the women either for servitude or for breeding."

It remained a long time after it was discovered inhabited by these people, and by another race improperly styled *Black Caribs*, who are in reality negroes descended, as is generally believed, from some who escaped out of a Guinea ship wrecked upon the coast, and gradually augmented by such as from time to time fled thither from Barbadoes. These nations were often at war; but when their quarrels were composed, they had a strength sufficient to prevent strangers from settling by force. The French, about half a century ago, at the request of the Caribs, made a descent from Martinico, and attacked the negroes, but were repulsed with loss; and found it their interest to conciliate a friendship with both nations by means of presents, and furnishing them with arms and ammunition.

St Vincent was long a neutral island; but, at the peace of 1763, the French agreed that the right to it should be vested in the English; who, in the sequel, at the instance of some rapacious planters, engaged in an unjust war against the Caribbees, who inhabited the windward side of the island, and who were obliged to consent to a peace, by which they ceded a very large tract of valuable land to the crown. The consequence of this was, that in the next war, in 1779, they greatly contributed to the reduction of this island by the French, who, however, restored it by the peace of 1783. Since that time it has continued in the possession of Great Britain. During the present war, the Caribs revolted; and, assisted by the French, spread desolation over the whole island. By the exertions of the governor, however, and the British forces in the West Indies, the revolt is in a great measure quelled, though it will be long before things are restored to their former state.

St Vincent is in length about 24 miles, and about 18 in breadth; in circumference between 60 and 70. The climate is very warm; at least in the judgment of the Europeans. The country is in general hilly, in some places mountainous; but interspersed with a variety of pleasant valleys, and some luxuriant plains, the soil being everywhere very fertile, and the high grounds are at least in general easy of ascent. Few islands of its extent are so well watered: for several rivers run down from the mountains, and smaller streams from almost every hill; there are likewise several fine springs at a little distance from the sea. The inhabitants raise all kinds of ground provisions in plenty, and with little trouble. The rivers supply them with a variety of fish; and the same may be said of the sea that washes their coasts. They have abundance of excellent fruits, and very fine timber fit for almost every use; and with which they formerly supplied their neighbours.

In 1770 its exports were, cotton, 284 bags, at 10l. per bag, 2840l. Coffee, 4818 hundred-weight one quarter six pound, at 3l. 5s. per hundred-weight, 15,659l. 9s. 8½d. Cacao, 1000 hogsheds and one barrel, at 25l. per hogshed, and 12l. per barrel, 25,012l. Rum, 346 hogsheds, at 10l. per hogshed, 3460l. Sugar, 2866 hogsheds, at 17l. 10s. per hogshed, 50,155l. In all to Great Britain, 97,126l. 9s. 8½d. To North America, 13,375l. Total 110,501l. 9s. 8½d. W. Long. 61°. N. Lat. 13°.

VINCI (Leonardo da), an illustrious Italian painter, descended from a noble Tuscan family, was born in the castle of Vinci near Florence in 1445. He was placed under Andrea Verochia, a celebrated painter in that city; but soon surpassed him and all his predecessors so much, as to be reputed the master of the third or golden age of modern painting. But his studies were far from terminating here; no man's genius was more universal: he applied himself to arts, to literature, and to the accomplishments of the body; and he excelled in every thing which he attempted. Lewis Sforza duke of Milan prevailed on him to be director of the academy for architecture he had just established; where Leonardo soon banished all the Gothic fashions, and reduced every thing to the happy simplicity of the Greek and Roman style. By the duke's order he constructed the famous aqueduct that supplies the city of Milan with water: this canal goes by the name of *Mortefana*, being above 200 miles in length, and conducts the water of the river Adda quite to the walls of the city. In 1479, he was desired to construct some new device for the entertainment of Louis XII. of France, who was then to make his entrance into Milan. Leonardo accordingly made a very curious automaton in the form of a lion, which marched out to meet the king, reared up on its hinder-legs before him, and opening its breast, displayed an escutcheon with fleur de lys quartered on it. The disorders of Lombardy, with the misfortunes of his patrons the Sforzi, obliging Leonardo to quit Milan, he retired to Florence, where he flourished under the Medici: here he raised the envy of Michael Angelo, who was his contemporary; and Raphael, from the study of his works, acquired his best manner of designing. At length, on the invitation of Francis I. he removed to France when above 70 years of age; where the journey and change of climate threw him into his last sickness: he languished for some months at Fontainebleau, where the king came frequently to see him; and one day rising up in his bed to acknowledge the honour done him, he fainted, and Francis supporting him, Leonardo died in his arms. His death happened in 1520. Some of his paintings are to be seen in England and other countries, but the greatest part of them are in Florence and France. He composed a great number of discourses on curious subjects; but none of them have

Vinculum have been published but his treatise on the Art of Painting. —For his anatomical knowledge, see ANATOMY (history of), p. 669.

Vinegar.

VINCULUM, in algebra, a character in form of a line, or stroke drawn over a factor, divisor, or dividend, when compounded of several letters or quantities to connect them, and shows that they are to be multiplied or divided, &c. together by the other term.

Thus $d \times a + b - c$ shows that d is to be multiplied into $a + b - c$.

VINE, in botany. See VITIS.

VINEGAR, ACETUM, an agreeable acid and penetrating liquor, prepared from wine, cyder, beer, and other liquors; of considerable use, both as a medicine and a sauce. The word is French, *vinaigre*; formed from *vin*, "wine;" and *aigre*, "sour." See ACETUM, and CHEMISTRY-Index.

Lavoisier's
Chemistry.

Wine and other vinous liquors are changed into vinegar by the acetous fermentation. The acetous fermentation is nothing more than the acidification or oxygenation of wine, produced in the open air by means of the absorption of oxygen. Vinegar is composed of hydrogen and carbon, united together in proportions not yet ascertained, and changed into the acid state by oxygen. As vinegar is an acid, we might conclude from analogy, that it contains oxygen; but this is put beyond doubt by direct experiments. In the first place, we cannot change wine into vinegar without the contact of air containing oxygen: secondly, this process is accompanied by a diminution of the air in which it is carried on from the absorption of its oxygen; and, thirdly, wine may be changed into vinegar by any other means of oxydation. Independent of the proofs which these facts furnish of the acetous acid being produced by the oxygenation of wine, an experiment made by Mr Chaptal, professor of chemistry at Montpellier, gives a distinct view of what takes place in this process. He impregnated some water with about its own bulk of carbonic acid gas, procured from beer vats in fermentation; and placed this water in a cellar, in vessels communicating with the air, and in a short time the whole was converted into acetous acid. This carbonic acid gas, procured from beer vats in fermentation, is not perfectly pure, but contains a great quantity of alcohol in solution; wherefore water impregnated with it contains all the materials necessary for forming the acetous acid. The alcohol furnishes hydrogen and one portion of carbon; the carbonic acid furnishes oxygen and the rest of the carbon; and the air of the atmosphere furnishes the rest of the oxygen necessary for changing the mixture into acetous acid. From this observation it follows, that nothing but hydrogen is wanting to convert carbonic acid into acetous acid; or, more generally, that by means of hydrogen; and according to the degree of oxydation, carbonic acid may be changed into all the vegetable acids: and, on the contrary, that, by depriving any of the vegetable acids of their hydrogen, they may be converted into carbonic acid.

Chaptal's
Chemistry.

The process indicated by Boerhaave for making vinegar is still the most frequently used. It consists in fixing two casks in a warm room or place. Two false bottoms of basket-work are fixed at a certain distance from the bottom, upon which the refuse of grapes and vine twigs are placed. One of these tuns is filled with wine, and the other only half filled. The fermentation begins in this last; and, when it is in full action, it is checked by filling the cask up with wine out of the other. The fermentation then takes place in the last-mentioned cask, that remained half filled; and this is checked in the same manner by pouring back the same quantity of liquid out of the other: and in this way the process is continued till the vinegar is made, which is usually in about 15 days. When the fermentation develops

itself, the liquid becomes heated and turbid; a great number of filaments are seen in it; it emits a lively smell; and much air is absorbed, according to the observation of the Abbé Rozier. A large quantity of lees is formed, which subsides when the vinegar becomes clear. This lees is very analogous to the fibrous matter.

Vinegar is purified by distillation. The first portions which pass over are weak; but soon afterwards the acetous acid rises, and is stronger the later it comes over in the distillation. This fluid is called *distilled vinegar*; and is thus cleared of its colouring principle, and the lees, which are always more or less abundant. Vinegar may likewise be concentrated by exposing it to the frost. The superabundant water freezes, and leaves the acid more condensed.

Method of making Cyder VINEGAR.—The cyder (the meanest of which will serve the purpose) is first to be drawn off fine into another vessel, and a quantity of the must of apples to be added: the whole is set in the sun, if there be conveniency for it; and at a week or nine days end it may be drawn off.

Method of making Beer VINEGAR.—Take a middling sort of beer, indifferently well hopped; into which, when it has worked well and grown fine, put some rape, or husks of grapes, usually brought home for that purpose: mash them together in a tub; then letting the rape settle, draw off the liquid part, put it into a cask, and set it in the sun as hot as may be; the bung being only covered with a tile, or slate-stone: and in about 30 or 40 days it will become a good vinegar, and may pass in use as well as that made of wine, if it be refined, and kept from turning musty.

Or thus:—To every gallon of spring-water add three pounds of Malaga raisins; which put into an earthen jar, and place them where they may have the hottest sun from May till Michaelmas; then pressing all well, tun the liquor up in a very strong iron-hooped vessel, to prevent its bursting: it will appear very thick and muddy when newly pressed; but will refine in the vessel, and be as clear as wine. Thus let it remain untouched for three months before it is drawn off, and it will prove excellent vinegar.

To make Wine VINEGAR.—Any sort of vinous liquor being mixed with its own faeces, flowers, or ferment, and its tartar first reduced to powder; or else with the acid and austere stalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar; and the whole being kept frequently stirring in a vessel which has formerly held vinegar, or set in a warm place full of the steams of the same, will begin to ferment anew, conceive heat, grow sour by degrees, and soon after turn into vinegar.

The remote subjects of acetous fermentation are the same with those of vinous; but the immediate subjects of it, are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is absolutely impossible to make vinegar of must, the crude juice of grapes, and other ripe fruits, without the previous assistance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The faeces of all acid wines. 2. The lees of vinegar. 3. Pulverized tartar, especially that of Rhenish wine, or the cream or crystals thereof. 4. Vinegar itself. 5. A wooden vessel well drenched with vinegar, or one that has long been employed to contain it. 6. Wine that has often been mixed with its own faeces. 7. The twigs of vines, and the stalks of grapes, currants, cherries, or other vegetables of an acid austere taste. 8. Bakers leaven, after it is turned acid. 9. All manner of ferments, compounded of those already mentioned.

VINEGAR Concentrated. See CHEMISTRY, n° 881.

VINEGAR (Salt of). See CHEMISTRY, n° 882.

Vinegar.

Eels

Vinegar *See in PINNAR.* See ANIMALCULE, n^o 9.

Virgil.

VINEYARD, a plantation of vines. The best situation of a vineyard is on the declivity of a hill facing the south.

VIO (Thomas de). See CAJETAN.

VIOL, a musical instrument of the same form with the violin, and, like that, struck with a bow.

VIOLA, in botany: A genus of plants of the class *syn-genesia*, order *monogynia*; in the natural system arranged under the 29th order, *Campanacea*. The calyx is pentaphyllous; the corolla five petaled, irregular, with a nectarium behind, horn-shaped; the capsule is above the germen, three valved, monolocular. There are 28 species; six of which are natives of Britain. The most important of these are, 1. The *palustris*, marsh violet. The leaves are smooth, reniform, two or three on each footstalk: flowers pale blue, small, inodorous. An infusion of the flowers is an excellent test of the presence of acids and alkalis. 2. The *odorata*, purple sweet violet, has leaves heart-shaped, notched: flowers deep purple, single; creeping scions. The flowers of this plant taken in the quantity of a dram or two are said to be gently purgative or laxative, and, according to Bergius and some others, they possess an anodyne and pectoral quality. 3. *Tricolor*, pansies, heart's ease, or three faces under a hood. The stems are diffuse, procumbent, triangular; the leaves oblong, cut at the edges; stipulæ dentated: the flowers purple, yellow, and light blue; inodorous.

This elegant little plant merits culture in every garden, for the beauty and great variety of its three-coloured flowers; and it will succeed anywhere in the open borders, or other compartments, disposed in patches towards the front; either by sowing the seed at once to remain, or by putting in young plants previously raised in a seed-bed: they will begin flowering early in summer, and will continue shooting and flowering in succession till winter; and even during part of that season, in mild weather.

The common violet is propagated by parting the roots, sometimes by seed.

VIOLATION, the act of violating, that is, forcing a woman, or committing a rape upon her.—This term is also used in a moral sense, for a breach or infringement of a law, ordinance, or the like.

VIOLET, in botany. See VIOLA.

VIOLET-Crab, in zoology. See CANCER.

VIOLIN, or FIDDLE, a musical instrument mounted with four strings or guts, and struck or played with a bow. The style and sound of the violin is the gayest and most sprightly of all other instruments; and hence it is of all others the fittest for dancing. Yet there are ways of touching it, which render it grave, soft, languishing, and fit for church or chamber music.—It generally makes the treble or highest parts in concerts. Its harmony is from fifth to fifth. Its play is composed of bass, counter-tenor, tenor, and treble; to which may be added, a fifth part: each part has four fifths, which rise to a greater seventeenth.

VIOLONCELLO, of the Italians, is properly our fifth violin; which is a little bass violin half the size of the common bass violin, and the strings bigger and longer in proportion: consequently its sound is an octave lower than our bass violin; which has a noble effect in concerts.

VIPER, in zoology. See COLUBER, POISON, and SERPENT; in which last article every thing concerning the poison of the viper, for which we referred from POISON, is already discussed.

VIRAGO, a woman of extraordinary stature and courage; and who, with the female sex, has the mien and air of a man, and performs the actions and exercises of men.

VIRGIL, or PUBLIUS VIRGILIUS MARO, the most excellent of all the Latin poets, was the son of a potter of

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Andes, near Mantua, where he was born, 70 years B. C. He studied first at Mantua; then at Cremona, Milan, and Naples; whence going to Rome, he acquired the esteem of the greatest wits and most illustrious persons of his time; and among others of the emperor Augustus, Mæcenas, and Pollio. He was well skilled not only in polite literature and poetry, but also in philosophy, the mathematics, geography, medicine, and natural history. Though one of the greatest geniuses of his age, and the admiration of the Romans, he always preserved a singular modesty, and lived chaste at a time when the manners of the people were extremely corrupt. He carried Latin poetry to such an high perfection, that he was justly esteemed the prince of Latin poets. He first turned himself to pastoral; and being captivated with the beauty and sweetness of Theocritus, was ambitious to introduce this new species of poetry among the Romans. His first performance in this way is supposed to have been written U. C. 709, the year before the death of Julius Cæsar, when the poet was in his 25th year: it is intitled *Alexis*. Possibly *Palamon* was his second: it is a close imitation of the fourth and fifth Idylls of Theocritus. Mr Wharton places *Silenus* next; which is said to have been publicly recited on the stage by Cytheris, a celebrated comedian. Virgil's fifth eclogue is composed in allusion to the death and deification of Cæsar. The battle of Philippi in 712 having put an end to the Roman liberty, the veteran soldiers began to murmur for their pay; and Augustus, to reward them, distributed among them the lands of Mantua and Cremona. Virgil was involved in this common calamity; and applied to Varus and Pollio, who warmly recommended him to Augustus, and procured for him his patrimony again. Full of gratitude to Augustus, he composed the *Tityrus*, in which he introduces two shepherds: one of them complaining of the distraction of the times, and of the havoc the soldiers made among the Mantuan farmers; the other rejoicing for the recovery of his estate, and promising to honour as a god the person who restored it to him. But our poet's joy was not of long continuance; for we are told, that when he returned to take possession of his farm, he was violently assaulted by the intruder, and would certainly have been killed by him if he had not escaped by swimming hastily over the Mincio. Upon this unexpected disappointment, he returned to Rome to renew his petition; and during his journey seems to have composed his ninth eclogue. The celebrated eclogue, intitled *Pollio*, was composed U. C. 714, upon the following occasion: The consul Pollio on the part of Antony, and Mæcenas on the part of Cæsar, had made up the differences between them; by agreeing, that Octavia, half sister to Cæsar, should be given in marriage to Antony. This agreement caused an universal joy; and Virgil, in his eclogue, testified his. Octavia was with child by her late husband Marcellus at the time of this marriage; and whereas the Sibylline oracles had foretold, that a child was to be born about this time, who should rule the world, and establish perpetual peace, the poet ingeniously supposes the child in Octavia's womb to be the glorious infant, under whose reign mankind was to be happy, the golden age to return from heaven, and fraud and violence to be no more. In this celebrated poem, the author, with great delicacy at the same time, pays his court to both the chiefs, to his patron Pollio, to Octavia, and to the unborn infant. In 715, Pollio was sent against the Parthini, a people of Illyricum; and during this expedition, Virgil addressed to him a beautiful eclogue, called *Pharmaceutria*. His tenth and last eclogue was addressed to Gallus.

In his 34th year, he retired to Naples, and laid the plan of his *Georgics*; which he undertook at the intreaties of Mæcenas, to whom he dedicated them. This wife and

Virgil. able minister resolved, if possible, to revive the decayed spirit of husbandry; to introduce a taste for agriculture, even among the great; and could not think of a better method to effect this, than to recommend it by the insinuating charms of poetry. Virgil fully answered the expectations of his patron by his *Georgics*. They are divided into four books. Corn and ploughing are the subject of the first, vines of the second, cattle of the third, and bees of the fourth.

He is supposed to have been in his 45th year when he began to write the *Æneid*; the design of which was to reconcile the Romans to the government of Augustus. Augustus was eager to peruse this poem before it was finished; and intreated him by letters to communicate it. Macrobius has preserved to us part of one of Virgil's answers to the emperor, in which the poet excuses himself: who, however, at length complied, and read himself the sixth book to the emperor; when Octavia, who had just lost her son Marcellus, the darling of Rome, and adopted son of Augustus, made one of the audience. Virgil had artfully inserted that beautiful lamentation for the death of young Marcellus, beginning with—*O nate, ingentem luctum ne quare tuorum*—but suppressed his name till he came to the line—*Tu Marcellus eris*: upon hearing which, Octavia could bear no more, but fainted away; overcome with surprise and sorrow. When she recovered, she made the poet a present of ten sesterces for every line, which amounted in the whole to above 2000l.

The *Æneid* being brought to a conclusion, but not to the perfection our author intended to give it, he resolved to travel into Greece, to correct and polish it at leisure. It was probably on this occasion that Horace addressed that affectionate ode to him, *Sic te Diva potens Cypri, &c.* Augustus returning victorious from the east, met with Virgil at Athens, who thought himself obliged to attend the emperor to Italy: but the poet was suddenly seized with a fatal distemper, which being increased by the agitation of the vessel, put an end to his life as soon as he landed at Brundisium, in his 52d year. He had ordered in his will, that the *Æneid* should be burnt as an unfinished poem; but Augustus forbade it, and had it delivered to Varius and Tucca, with the strictest charge to make no additions, but only to publish it correctly. He died with such steadiness and tranquillity, as to be able to dictate his own epitaph in the following words:

*Mantua me genuit: Calabri rapuere, tenet nunc
Parthenope: cecini Pasce, Rura, Duces.*

His bones were carried to Naples, according to his earnest request; and a monument was erected at a small distance from the city.

Virgil was of a swarthy complexion, tall, of a sickly constitution, and afflicted with frequent head-achs and spitting of blood. He was so very bashful, that he often ran into the shops to prevent being gazed at in the streets; yet was so honoured by the Roman people, that once coming into the theatre, the whole audience rose up out of respect to him. He was of a thoughtful and melancholy temper; he spoke little, and loved retirement and contemplation. His fortune was affluent; he had a fine house and well-furnished library near Mæcenas's gardens, on the Esquiline mount at Rome, and also a delightful villa in Sicily. He was so benevolent and inoffensive, that most of his contemporary poets, though they envied each other, agreed in loving and esteeming him. He revised his verses with prodigious severity; and used to compare himself to a she bear, which licked her cubs into shape.

The best edition of Virgil's works are those of Mosvicius, with the notes of Servius, printed at Lewarden in 1717, 2 vols 4to; and that of Burman, at Amsterdam, 1746, in 4

vols 4to. There are several English translations, which are well known.

VIRGIL (Polydore), an English historian, born at Urbino in Italy, was sent in the beginning of the 16th century, by pope Alexander VI. as sub-collector of the Papal tax, called *Peter-pence*, in this kingdom. He had not been long in England before he obtained preferment in the church; for in 1503 he was presented to the rectory of Church-Langton in the archdeaconry of Leicester. In 1507 he was collated to the prebend of Scamlesby in the church of Lincoln; and in the same year was made archdeacon of Wells, and prebendary of Hereford. In 1513, he resigned his prebend of Lincoln, and was collated to that of Oxgate in St Paul's, London. We are told, that on his preferment to the archdeaconry of Wells, he resigned the office of sub-collector to the pope, and determined to spend the remainder of his life in England, the History of which kingdom he began in the year 1505, at the command of Henry VII. That work cost him 12 years labour. In 1526, he finished his treatise on Prodigies. Polydore continued in England during the whole reign of Henry VIII. and part of that of Edward VI. whence it is concluded that he was a moderate Papist. In 1550, being now an old man, he requested leave to revisit his native country. He was accordingly dismissed with a present of 300 crowns, together with the privilege of holding his preferments to the end of his life. He died at Urbino in the year 1555. As an historian, he is accused by some as a malignant slanderer of the English nation; yet Jovius remarks, that the French and Scotch accuse him of having flattered that nation too much: (See his *Elog.* cap. 135. p. 179). Besides the above, he wrote, 1. *De rerum inventoribus*; of which an English translation was published by Langley in 1663. It was also translated into French and Spanish. 2. *De prodigiis et sortibus*. 3. *Episcoporum Angliæ catalogus*. Manuscript. 4. *De vita perfecta*, Basil, 1546, 1553, 8vo. 5. *Epistole eruditæ*; and some other works.

VIRGINIA, one of the United States of North America, is bounded on the east by the Atlantic Ocean, on the north by Pennsylvania and the river Ohio, on the west by the Mississippi, on the south by North Carolina.

These boundaries include an area somewhat triangular of 121,525 miles, whereof 79,650 lie westward of the Alleghany mountains, and 57,034 westward of the meridian of the mouth of the Great Kanhaway. This state is therefore one third larger than the islands of Great Britain and Ireland, which are reckoned at 88,357 square miles.

The principal rivers in Virginia are, Roanoke, James river, which receives the Rivanna, Appamattox, Chickahominy, Nansemond, and Elizabeth rivers; York river, which is formed by the junction of Pamunky and Mattapony rivers; Rappahannok, and Patomak.

The mountains are not solitary and scattered confusedly over the face of the country; they commence at about 150 miles from the sea-coast, and are disposed in ridges one behind another, running nearly parallel with the coast, though rather approaching it as they advance north-eastwardly. To the south-west, as the tract of country between the sea-coast and the Mississippi becomes narrower, the mountains converge into a single ridge, which, as it approaches the Gulph of Mexico, subsides into plain country, and gives rise to some of the waters of that Gulph.

From the great extent of Virginia, it may be expected that the climate is not the same in all its parts. It is remarkable that, proceeding on the same parallel of latitude westwardly, the climate becomes colder in like manner as when you proceed northwardly. This continues to be the case till you attain the summit of the Alleghany, which is the highest land between the ocean and the Mississippi. From

Virgil,
Virginia.

Jefferson's
Virginia.

Virginia. From thence, descending in the same latitude to the Mississippi, the change reverses; and, if we may believe travellers, it becomes warmer there than it is in the same latitude on the sea-side. Their testimony is strengthened by the vegetables and animals which subsist and multiply there naturally, and do not on the sea-coast. Thus catalpas grow spontaneously on the Mississippi as far as the latitude of 37, and reeds as far as 38, degrees. Perroquets even winter on the Sioto in the 30th degree of latitude. In the summer of 1779, when the thermometer was at 90 degrees at Monticello, and 96 degrees at Williamsburg, it was 110 degrees at Kaskaskia. Perhaps the mountain, which overhangs this village on the north side, may by its reflection have contributed somewhat to produce this heat.

The number of free inhabitants in this state in 1782 was 296,852, slaves 270,762. The number of free inhabitants were to the number of slaves nearly as 11 to 10.

The college of William and Mary is the only public seminary of learning in Virginia. It was founded in the time of king William and queen Mary, who granted to it 20,000 acres of land, and a penny a pound duty on certain tobaccos exported from Virginia and Maryland. The assembly also gave it by temporary law a duty on liquors imported, and skins and furs exported. From these resources it received upwards of 3000 l. *communibus annis*. The buildings are of brick, sufficient for an indifferent accommodation of perhaps 100 students. By its charter it was to be under the government of 20 visitors, who were to be its legislators; and to have a president and six professorships, which at present stand thus:—A professorship for Law and Police; Anatomy and Medicine; Natural Philosophy and Mathematics; Moral Philosophy, the Law of Nature and Nations, the Fine Arts; Modern Languages. For the Brafferton. The college edifice is a huge, misshapen pile, which, but that it has a roof, would be taken for a brick-kiln. In 1787, there were about 30 young gentlemen members of this college, a large proportion of which were law students. There are a number of flourishing academies in Virginia; one in Prince Edward county, one at Alexandria, one at Norfolk, one at Hanover, and others in other places.

The present denominations of Christians in Virginia are Presbyterians, who are the most numerous, and inhabit the western parts of the state; Episcopalians, who are the most ancient settlers, and occupy the eastern and first settled parts of the state. Intermingled with these are great numbers of Baptists and Methodists. The bulk of these last mentioned religious sects are of the poorer sort of people, and many of them are very ignorant (as is indeed the case with the other denominations), but they are generally a virtuous well-meaning set of people.

Virginia has produced some of the most distinguished men that have been active in effecting the two late important revolutions in America, whose political and military character will rank among the first in the page of history. The great body of the people do not concern themselves with politics; so that their government, though nominally republican, is in fact oligarchical or aristocratical. The Virginians who are rich, are in general sensible, polite, and hospitable and of an independent spirit. The poor are ignorant and abject; all are of an inquisitive turn, and in many other respects very much resemble the people in the eastern states. There is a much greater disparity between the rich and the poor in Virginia than in any of the northern states. A spirit for literary inquiries, if not altogether confined to a few, is, among the body of the people, evidently subordinate to a spirit of gaming and barbarous sports. At almost every tavern or ordinary on the public road there is a billiard table, a backgammon table, cards, and other implements for various games. To

these public houses the gambling gentry in the neighbourhood resort to kill time which hangs heavily upon them; and at this business they are extremely expert, having been accustomed to it from their earliest youth. The passion for cock-fighting, a diversion not only inhumanly barbarous, but infinitely beneath the dignity of a man of sense, is so predominant, that they even advertise their matches in the public newspapers.

The executive powers are lodged in the hands of a governor chosen annually, and incapable of acting more than three years in seven. He is assisted by a council of eight members. The judiciary powers are divided among several courts. Legislation is exercised by two houses of assembly, the one called the *House of Delegates*, composed of two members from each county, chosen annually by the citizens possessing an estate for life in 100 acres of uninhabited land, or 25 acres with a house on it, or in a house or lot in some town. The other called the *Senate*, consisting of 24 members, chosen quadrennially by the same electors, who for this purpose are distributed into 24 districts. The concurrence of both houses is necessary to the passage of a law. They have the appointment of the governor and council, the judges of the superior courts, auditors, attorney-general, treasurer, register of the land office, and delegates to Congress.

Before the present war, there was exported from this state, *communibus annis*, nearly as follows:

Articles.	Quantity.
Tobacco, - - - - -	55,000 hhds. of 1000 lb.
Wheat, - - - - -	800,000 bushels
Indian Corn, - - - - -	600,000 bushels
Shipping, - - - - -	
Masts, planks, skantling, shingles, staves, - - - - -	
Tar, pitch, turpentine, - - - - -	30,000 barrels
Peltry, viz. skins of deer, beavers, otter, - - - - -	
mulch-rats, racoons, foxes, - - - - -	180 hhds. of 600 lb.
Pork, - - - - -	4,000 barrels
Flax seed, hemp, cotton, - - - - -	
Pit coal, pig iron, - - - - -	
Pease, - - - - -	5,000 bushels
Beef, - - - - -	1,000 barrels
Sturgeon, white shad, herring, - - - - -	
Brandy from peaches and apples, whisky, - - - - -	
Horses, - - - - -	

The amount of the above articles is 850,000 l. Virginia money, or 607,142 guineas.

The whole country before it was planted was one continued forest interspersed with marshes, which in the West Indies they call *swamps*. No country now produces greater quantities of excellent tobacco; and the soil is generally so sandy and shallow, that after they have cleared a fresh piece of ground out of the woods, it will not bear tobacco after two or three years unless cow-penned and well dunged. The forests yield oaks, poplars, pines, cedars, cypresses, sweet myrtles, chefnuts, hickory, live oak, walnut, dog-wood, alder, hazel, chinkapins, locust-trees, sassafras, elm, ash, beech, with a great variety of sweet gums and incense, which distil from several trees; pitch, tar, rosin, turpentine, plank-timber, masts, and yards. Virginia yields also rice, hemp, Indian corn, plenty of pasture, with coal, quarries of stone, and lead and iron ore.

VIRGO, in astronomy, one of the signs or constellations of the zodiac.

VIRGULA DIVINITORIA, divining rod. See MINE, Vol. XII. p. 41.

VIRTUAL, or POTENTIAL; something that has a power or virtue of acting or doing. The term is chiefly understood of something that acts by a secret invisible cause, in opposition to actual and sensible.

VIRTUE, a term used in various significations. In the general

Virtuoso
||
Vistula.

general it denotes power, or the perfection of any thing, whether natural or supernatural, animate or inanimate, essential or accessory. But, in its more proper or restrained sense, virtue signifies a habit, which improves and perfects the possessor and his actions. See MORAL PHILOSOPHY, n° 84.

VIRTUOSO, an Italian term lately introduced into the English, signifying a man of curiosity and learning, or one who loves and promotes the arts and sciences. But among us the term seems to be appropriated to those who apply themselves to some curious and quaint rather than immediately useful art or study; as antiquaries, collectors of rarities of any kind, microscopical observers, &c.

VIRULENT, a term applied to any thing that yields a virus; that is, a contagious or malignant pus.

VISCERA, in anatomy, a term signifying the same with entrails; including the heart, liver, lungs, spleen, intestines, and other inward parts of the body.

VISCIDITY, or VISCOSITY, the quality of something that is viscid or viscous; that is, glutinous and sticky like bird-lime, which the Latins call by the name of *viscus*.

VISCOUNT (*Vice Comes*), was anciently an officer under an earl, to whom, during his attendance at court, he acted as deputy to look after the affairs of the country. But the name was afterwards made use of as an arbitrary title of honour, without any shadow of office pertaining to it, by Henry VI.; when, in the 18th year of his reign, he created John Beaumont a peer by the name of *viscount Beaumont*; which was the first instance of the kind.

A viscount is created by patent as an earl is; his title is *Right Honourable*; his mantle is two doublings and a half of plain fur; and his coronet has only a row of pearls close to the circle.

VISCUM, in botany; a genus of plants of the class *diæcia*, order *tetrandria*, and in the natural system arranged under the 48th order, *aggregata*. The male calyx is quadripartite; the antheræ adhere to the calyx: the female calyx consists of four leaves; there is no style; the stigma is obtuse. There is no corolla; the fruit is a berry with one seed. There are 9 species; only one of which is a native of Britain, viz. the *album*, or common mistletoe. It is a shrub growing on the bark of several trees: the leaves are conjugate and elliptical, the stem forked; the flowers whitish in the axæ of the leaves. This plant was reckoned sacred among the druids.

VISHNOU, that person in the triad of the Bramins who is considered as the *preserver* of the universe. *Brahma* is the creator and *Siva* the destroyer; and these two, with Vishnou, united in some inexplicable manner, constitute *Brahme*, or the supreme numen of the Hindoos. See POLYTHEISM, n° 36.

VISIBLE, something that is an object of sight or vision; or something whereby the eye is affected so as to produce this sensation.

VISIER, an officer or dignitary in the Ottoman empire, whereof there are two kinds; one called by the Turks *Visier-azem*, that is, "grand visier," is the prime minister of state in the whole empire. He commands the army in chief, and presides in the divan or great council. Next to him are six other subordinate visiers, called *visiers of the bench*; who officiate as his counsellors or assessors in the divan.

VISION, in optics, the act of seeing or perceiving external objects by means of the organ of sight, the eye. See ANATOMY, n° 142, and METAPHYSICS, n° 49—54.

VISTULA, or WEISEL, a large river of Poland, which taking its rise in the mountains south of Silesia, visits Cracow, Warsaw, &c. and continuing its course northward, falls into the Baltic sea below Dantzic.

VISUAL, in general, something belonging to vision.

VITAL, in physiology, an appellation given to whatever ministers principally to the constituting or maintaining life in the bodies of animals: thus the heart, lungs, and brain, are called *vital parts*; and the operations of these parts by which the life of animals is maintained are called *vital functions*.

VITALIANO (Donati), an eminent naturalist, was born in Padua the 8th of September 1717. He showed from his childhood the greatest inclination for botany and natural history; and, at the age of twelve years, knew all the medicinal plants, and had made a collection of natural productions. When some years older, he profited by the friendship of the celebrated Pontedero, and was generously furnished with books and informations by the living professor Vallisneri junior. His best masters were, however, his own mountain and maritime peregrinations; which he began in Dalmatia in 1743, and continued for five years. He was chosen for adjutant to the marquis Poleni, public professor of experimental physic, and cultivated under so great a master all the parts of physico-mathematics. With him he made a journey to Rome, and there became an intimate friend of Leprotti the papal physician, to whom he afterwards dedicated his *Saggio della flora naturale dell' Adriatico*; a work of great merit, which count Ginanni of Ravenna endeavoured to depreciate, though with little success. The essay of Donati was published in 1750, and was afterwards translated into French. The fame which our author acquired induced his Sardinian majesty to appoint him professor of botany and natural history at Turin. He went there very willingly; made many excursions among the mountains of Savoy and Genoa, and would have been happy could he always have conversed with the mountaineers, who generally are harmless people. The king his master sent him out of the way of his enemies, whose envy and hatred his merit alone had raised; he commanded him to set out on a voyage to Egypt, and from thence to visit Syria, Palestine, Arabia, and the East Indies, to make observations and to collect the rarest productions of nature. In 1759 he was in Alexandria, saw Egypt as far as the great cataract of the Nile, and a great part of Palestine, Arabia, and Chaldea; and in all those travels was exposed to suffer the cruel consequences of a bad choice which he had made of his companions. While he staid at Bassora, waiting for orders from court, he fell ill of a putrid fever, and died in a few days. The news of his death came to Turin about the end of October 1763. He left in manuscript two volumes in folio.

VITELLUS, the yolk of an egg. See EGG.

VITIS, in botany: A genus of the class *pentandria*, order *monogynia*; and in the natural system arranged under the 46th order, *pectoracea*. The petals cohere at the top, and are withered; the fruit is a berry with five seeds. There are 11 species; the most important of which is the *vinifera* or common vine, which has naked, lobed, sinuated leaves. There are a great many varieties; but a recital of their names would be tiresome without being useful. All the sorts are propagated either from layers or cuttings, the former of which is greatly practised in England, but the latter is much preferable.

In choosing the cuttings, you should always take such shoots of the last year's growth as are strong and well ripened; these should be cut from the old vine, just below the place where they were produced, taking a knot, or piece of the two-years wood to each, which should be pruned smooth; then you should cut off the upper part of the shoots, so as to leave the cutting about sixteen inches long. When the piece or knot of old wood is cut at both ends, near the young

Visual
||
Vitis.

Vitis. young shoot, the cutting will resemble a little mallet; from whence Columella gives the title of *malleolus* to the vine-cuttings. In making the cuttings after this manner, there can be but one taken from each shoot; whereas most persons cut them into lengths of about a foot, and plant them all; which is very wrong, for various reasons too tedious to mention.

When the cuttings are thus prepared, if they are not then planted, they should be placed with their lower part in the ground in a dry soil, laying some litter upon their upper parts to prevent them from drying: in this situation they may remain till the beginning of April (which is the best time for planting them); when you should take them out, and wash them from the filth they have contracted; and if you find them very dry, you should let them stand with their lower parts in the water six or eight hours, which will distend their vessels, and dispose them for taking root. If the ground be strong and inclined to wet, you should open a trench where the cuttings are to be planted, which should be filled with lime rubbish, the better to drain off the moisture: then raise the borders with fresh light earth about two feet thick, so that it may be at least a foot above the level of the ground: then you should open the holes at about six feet distance from each other, putting one good strong cutting into each hole, which should be laid a little sloping, that their tops may incline to the wall; but it must be put in so deep, as that the uppermost eye may be level with the surface of the ground; for when any part of the cutting is left above ground, most of the buds attempt to shoot, so that the strength of the cuttings is divided to nourish so many shoots, which must consequently be weaker than if only one of them grew; whereas, by burying the whole cutting in the ground, the sap is all employed on one single shoot, which consequently will be much stronger; besides, the sun and air are apt to dry that part of the cutting which remains above ground, and so often prevents their buds from shooting.

Having placed the cutting into the ground, fill up the hole gently, pressing down the earth with your foot close about it, and raise a little hill just upon the top of the cutting, to cover the upper eye quite over, which will prevent it from drying. Nothing more is necessary but to keep the ground clear from weeds until the cuttings begin to shoot; at which time you should look over them carefully, to rub off any small shoots, if such are produced, fastening the first main shoot to the wall, which should be constantly trained up, as it is extended in length, to prevent its breaking or hanging down. You must continue to look over these once in about three weeks during the summer season, constantly rubbing off all lateral shoots which are produced; and be sure to keep the ground clear from weeds, which, if suffered to grow, will exhaust the goodness of the soil and starve the cuttings. The Michaelmas following, if your cuttings have produced strong shoots, you should prune them down to two eyes. In the spring, after the cold weather is past, you must gently dig up the borders to loose the earth; but you must be very careful, in doing this, not to injure the roots of your vines: you should also raise the earth up to the stems of the plants, so as to cover the old wood, but not so deep as to cover either of the eyes of the last year's wood. After this they will require no farther care until they begin to shoot; when you should rub off all weak dangling shoots, leaving no more than the two produced from the two eyes of the last year's wood, which should be fastened to the wall. From this time till the vines have done shooting, you should look them over once in three weeks or a month, to rub off all lateral shoots as they are produced, and to fasten the main shoots to the wall as they

are extended in length; about the middle or latter end of July, it will be proper to nip off the tops of these two shoots which will strengthen the lower eyes. During the summer season you must constantly keep the ground clear from weeds: nor should you permit any sort of plants to grow near the vines, which would not only rob them of nourishment, but shade the lower parts of the shoots, and thereby prevent their ripening; which will not only cause their wood to be spongy and luxuriant, but render it less fruitful.

As soon as the leaves begin to drop in autumn, you should prune these young vines again, leaving three buds to each of the shoots, provided they are strong: otherwise it is better to shorten them down to two eyes if they are good; for it is a very wrong practice to leave much wood upon young vines, or to leave their shoots too long, which greatly weakens the roots: then you should fasten them to the wall, spreading them out horizontal each way, that there may be room to train the new shoots the following summer, and in the spring the borders must be digged as before.

The uses of the fruit of the vine for making wine, &c. are well known. The vine was introduced by the Romans into Britain, and appears formerly to have been very common. From the name of vineyard yet adhering to the ruinous sites of our castles and monasteries, there seem to have been few in the country but what had a vineyard belonging to them. The county of Gloucester is particularly commended by Malmesbury in the twelfth century, as excelling all the rest of the kingdom in the number and goodness of its vineyards. In the earlier periods of our history, the isle of Ely was expressly denominated the *Isle of Vines* by the Normans. Vineyards are frequently noticed in the descriptive accounts of doomsday; and those of England are even mentioned by Bede as early as the commencement of the eighth century.

Doomsday exhibits to us a particular proof that wine was made in England during the period preceding the conquest. And after the conquest the bishop of Ely appears to have received at least three or four tuns of wine annually, as tythes, from the produce of the vineyards in his diocese; and to have made frequent reservations in his leases of a certain quantity of wine for rent. A plot of land in London, which now forms East-Smithfield and some adjoining streets, was withheld from the religious house within Aldgate by four successive constables of the Tower, in the reigns of Rufus, Henry, and Stephen, and made by them into a vineyard to their great emolument and profit. In the old accounts of rectorial and vicarial revenues, and in the old registers of ecclesiastical suits concerning them, the tithe of wine is an article that frequently occurs in Kent, Surry, and other counties. And the wines of Gloucestershire, within a century after the conquest, were little inferior to the French in sweetness. The beautiful region of Gaul, which had not a single vine in the days of Cæsar, had numbers so early as the time of Strabo. The south of it was particularly stocked with them; and they had even extended themselves into the interior parts of the country: But the grapes of the latter did not ripen kindly. France was famous for its vineyards in the reign of Vespasian, and even exported its wines into Italy. The whole province of Narbonne was then covered with vines: and the wine-merchants of the country were remarkable for all the knavish dexterity of our modern brewers, tinging it with smoke, colouring it (as was suspected) with herbs and noxious dyes, and even adulterating the taste and appearance with aloes. And, as our first vines would be transplanted from Gaul, so were in all probability those of the Allobroges in Franche Compté. These were peculiarly fitted for cold countries. They ripened even in the frosts of the advancing winter. And they were of the same colour,

Vitis.

Vitis
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Viverra.

colour, and seem to have been of the same species, as the black Muscadines of the present day, which have lately been tried in the island, I think, and found to be fittest for the climate. These were pretty certainly brought into Britain a little after vines had been carried over all the kingdoms of Gaul, and about the middle of the third century; when the numerous plantations had gradually spread over the face of the latter, and must naturally have continued their progress into the former.

The Romans, even nearly to the days of Lucullus, were very seldom able to regale themselves with wine. Very little was then raised in the compass of Italy. And the foreign wines were so dear, that they were rarely produced at an entertainment; and when they were, each guest was indulged only with a single draught. But in the seventh century of Rome, as their conquests augmented the degree of their wealth, and enlarged the sphere of their luxury, wines became the object of particular attention. Many vaults were constructed, and good stocks of liquor deposited in them. And this naturally gave encouragement to the wines of the country. The Falernian rose immediately into great repute; and a variety of others, that of Florence among the rest, succeeded it about the close of the century. And the more westerly parts of the European continent were at once subjected to the arms, and enriched with the vines, of Italy.

But the scarcity of the native, and dearness of the foreign, wines in that country, several ages before the conquest of Lancashire, had called out the spirit of invention, and occasioned the making of factitious wines. These were still continued by the Romans, and naturally taught to the Britons. And they were made of almost all the products of the orchard and garden, the pear, the apple, mulberry, servis, and rose. Two of them, therefore, were those agreeable liquors which we still denominate *cyder* and *perry*. The latter would be called *pyrum* by the Romans, and is therefore called *perry* or *pear-water* by us. And the former assumed among the Romans the appellation of *sicera*, which was colloquially pronounced by them *sidera*, as the same pronunciation of it among the present Italians shows; and retains therefore the denomination of *cyder* among ourselves.

VITREOUS HUMOUR OF THE EYE. See ANATOMY, n° 142.

VITRIFICATION, in chemistry, the conversion of a body into glass by means of fire. See GLASS.

VITRIOL, a compound salt, formed by the union of iron, copper, or zinc with the sulphuric acid. It is of three colours, white, blue, and green, according to the metal. See CHEMISTRY-Index.

VITRIOLATED, among chemists, something impregnated, or supposed to be so, with vitriol or its acid.

VITRIOLIC ACID. See SULPHURIC Acid and CHEMISTRY-Index.

VITRUVIUS POLLIO (Marcus), a very celebrated Roman architect, was, according to the common opinion, born at Verona, and lived in the reign of Augustus, to whom he dedicated his excellent treatise on architecture, divided into ten books. William Philander's edition of this celebrated work is esteemed. Claudius Perrault has given an excellent translation of it in French, with learned notes. There are also several English translations of Vitruvius.

VITUS'S DANCE. See MEDICINE, n° 284.

VIVERRA, THE WEASEL; a genus of quadrupeds belonging to the order of feræ. They have six fore-teeth, the intermediate ones being shorter, and more than three grinders, and the claws are exerted. There are 27 species, the principal of which are,

1. The ichneumon, with the tail tapering to a point, and the toes distant from each other; inhabits Egypt, Barbary, India and its islands. It is there a most useful animal, being an inveterate enemy to the serpents and other noxious reptiles which infest the torrid zone: it attacks without dread that most fatal of serpents the Naja, or Cobra de Capello; and should it receive a wound in the combat, instantly retires, and is said to obtain an antidote from a certain herb (according to Sparmann the *ophiorhiza*); after which it returns to the attack, and seldom fails of victory: it is a great destroyer of the eggs of crocodiles, which it digs out of the sand; and even kills multitudes of the young of those terrible reptiles: it was not therefore without reason that the ancient Egyptians ranked the ichneumon among their deities. This animal is at present domesticated and kept in houses in India and in Egypt, for it is more useful than a cat in destroying rats and mice; and grows very tame. It is very active; springs with great agility on its prey; will glide along the ground like a serpent, and seem as if without feet. It sits up like a squirrel, and eats with its forefeet, catching any thing that is flung to it. It is a great enemy to poultry, and will feign itself dead till they come within reach: loves fish; draws its prey, after sucking the blood, to its hole. Its excrements are very fetid; when it sleeps, it brings its head and tail under its belly, appearing like a round ball, with two legs sticking out. Rumphius observes how skilfully it seizes the serpents by the throat, so as to avoid receiving an injury; and Lucan beautifully describes the same address of this animal in conquering the Egyptian asp.

2. The vulpecula, or stifling weasel, has a short slender nose; short ears and legs; black body, full of hair; the tail long, of a black and white colour; length from nose to tail about 18 inches. It inhabits Mexico, and perhaps other parts of America. This and some other species are remarkable for the pestiferous, suffocating, and most fetid vapour they emit from behind, when attacked, pursued, or frightened: it is their only means of defence. Some turn their tail to their enemy, and keep them at a distance by a frequent crepitus; and others ejaculate their urine, tainted with the horrid effluvia, to the distance of 18 feet. The pursuers are stopped with the terrible stench. Should any of this liquor fall into the eyes, it almost occasions blindness: if on the clothes, the smell will remain for several days, in spite of all washing; they must even be buried in fresh soil, in order to be sweetened. Dogs that are not true bred, run back as soon as they perceive the smell: those that have been used to it, will kill the animal; but are often obliged to relieve themselves by thrusting their noses into the ground. There is no bearing the company of a dog that has killed one for several days. Professor Kalm was one night in great danger of being suffocated by one that was pursued into a house where he slept; and it affected the cattle so, that they bellowed through pain. Another, which was killed by a maid-servant in a cellar, so affected her with its stench, that she lay ill for several days; all the provisions that were in the place were so tainted, that the owner was obliged to throw them away. Notwithstanding this, the flesh is reckoned good meat, and not unlike that of a pig; but it must be skinned as soon as killed, and the bladder taken carefully out. It breeds in hollow trees, or holes under ground, or in clefts of rocks; climbs trees with great agility; kills poultry; eats eggs, and destroys young birds.

3. The zibetha, or civet-cat, has short rounded ears; the back and sides cinereous, tinged with yellow, marked with large dusky spots disposed in rows; the hair coarse; that on the top of the body longest, standing up like a mane; the

Viverra.

Vives
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Ulietea.

the tail sometimes wholly black; sometimes spotted near the base; length, from nose to tail, about two feet three inches; the tail 14 inches; the body pretty thick. It inhabits India, the Philippine Isles, Guinea, Ethiopia, and Madagascar. The famous drug musk, or civet, which is produced from an aperture between the privities and the anus, in both sexes, is secreted from certain glands. The persons who keep them procure the musk by scraping the inside of this bag twice a-week with an iron spatula, and get about a dram each time: but it is seldom sold pure, being generally mixed with suet or oil, to make it more weighty. The males yield the most, especially when they are previously irritated. They are fed, when young, with pap made of millet, with a little flesh or fish; when old, with raw flesh. In a wild state, they prey on fowl. These animals seem not to be known to the ancients: it is probable the drug was brought without their knowing its origin; for it is certain the fine gentlemen in Rome used perfumes.

VIVES, in farriery. See there, § xiv.

VIVIPAROUS, in natural history, an epithet applied to such animals as bring forth their young alive and perfect; in contradistinction to those that lay eggs, which are called *oviparous* animals.

UKRAINE, a large country of Europe, lying on the borders of Turkey in Europe, Poland, Russia, and Little Tartary. Its name properly signifies a *frontier*. By a treaty between Russia and Poland in 1693, the latter remained in possession of all that part of the Ukraine lying on the west side of the river Dnieper, which is but indifferently cultivated; while the country on the east side, inhabited by the Cossacs, is in much better condition. The Russian part is comprised in the government of Kiof; and the empress of Russia having obtained the Polish palatinate of Kiof, by the treaty of partition in 1793, the whole of the Ukraine, on both sides of the Dnieper, belongs now to that ambitious and formidable power. The principal town is Kiof.

ULCER, in surgery. See Chap. IV. Sect. 1.

ULCER, in farriery. See FARRIERY, Sect. 28.

ULEX, in botany: A genus of plants of the class of *diadelphia*, and order of *decandria*; and in the natural system arranged under the 32d order, *Papilionaceæ*. The calyx consists of two leaves quinque-dentate: pod almost covered by the calyx. There are two species; one of which, the *Europæus*, the furze, gorse, or whin, is a native of Britain; it is too well known to need description. Its uses, however, are many; as a fuel where wood and coals are scarce; and as hedge-wood upon light barren land: its use as horse provender too seems to be fully proved though not yet established. See AGRICULTURE, n° 47. and FENCE.

ULIETEÀ, one of the Society Islands. This island is about 21 leagues in circuit. Its productions are plantains, cocoa nuts, yams, hogs, and fowl; the two latter of which are scarce. The soil on the top of one of the hills was found to be a kind of stone marle; on the sides were found some scattered flints, and a few small pieces of a cavernous or spongy stone lava, of a whitish colour, which seemed to contain some remains of iron, so that it may possibly be here lodged in the mountains in a great quantity. Nothing was seen on this island to distinguish either its inhabitants, or their manners, from the other neighbouring islands. The first Europeans who landed on this shore were Mr (now Sir Joseph) Banks and Dr Solander; they were received by the natives in the most courteous manner, reports concerning them having been their harbingers from Otaheite. Every body seemed to fear and respect them, placing in them at the same time the utmost confidence: behaving, as if conscious that their visitors possessed the power of doing them mischief without a disposition to make use of it.

ULIGINOUS, in agriculture, an appellation given to a moist, moorish, and fenny soil.

ULLAGE, in gauging, is so much of a cask or other vessel as it wants of being full.

ULM, a free and imperial city of Germany, in the circle of Swabia, seated on the river Iller. It is a pretty large place, defended by fortifications; and the inhabitants are Protestants. Here the archives of the circle are deposited, and it carries on a very great trade. The elector of Bavaria became master of it, in 1702, by a stratagem; but, in 1704, the French being vanquished at the battle of Hochstet, the Bavarians surrendered it by capitulation. The Roman Catholics have but two churches, all the rest belonging to the Protestants. E. Long. 10. 12. N. Lat. 48. 25.

ULMUS, in botany: A genus of plants belonging to the class of *pentandria*, and order of *digynia*; and in the natural system arranged under the 53d order, *Scabridæ*. The calyx is quinquefid; there is no corolla. The fruit is a dry, compressed, membranaceous berry. There are three species, one of which is a native of Britain. The *campestris*, common elm. The leaves are rough, oval, pointed, doubly serrated, unequal at the base. Bark of the trunk cracked and wrinkled. Fruit membranous. The *montana*, or wych elm, is generally reckoned a variety of this species.

All the sorts of elm may be either propagated by layers or suckers taken from the roots of the old trees, the latter of which is generally practised by the nursery-gardeners: but as these are often cut up with indifferent roots, they often miscarry, and render the success doubtful; whereas those which are propagated by layers are in no hazard, and always make better roots, and come on faster than the other, and do not send out suckers from their roots in such plenty, for which reason this method should be more universally practised.

The elm delights in a stiff strong soil. It is observable, however, that here it grows comparatively slow. In light land, especially if it be rich, its growth is very rapid; but its wood is light, porous, and of little value, compared with that which grows upon strong land; which is of a closer stronger texture, and, at the heart, will have the colour, and almost the heaviness and the hardness, of iron: On such soils the elm becomes profitable, and is one of the trees which ought in preference to all others to engage the planter's attention.

ULSTER, the most northerly province of Ireland. In Latin it is called *Ultonia*, in Irish *Cui Guilly*; and gives the title of *earl* to the dukes of York of the royal family. It is bounded by the Atlantic Ocean on the west, St George's Channel and the Irish Sea on the east, the Deucalionian Ocean on the north, and on the south and south-west the provinces of Leinster and Connaught. Its greatest length is near 120 miles, its breadth about 100; and its circumference, including the windings and turnings, 460; containing 9 counties, 58 market-towns and boroughs, 1 archbishopric, 6 bishoprics, and 214 parishes. Ulster abounds in lakes and rivers, which supply it with variety of fine fish, especially salmon, besides what it has from the sea, with which a great part of it is bounded. The southern parts of it are rich, fertile, well cultivated, and inclosed; but the greater part of the northern is open and mountainous.—The towns of this province are in general the neatest and best built of any in Ireland, as well as the farm-houses; which in most parts of the kingdom are constructed of no better materials than clay and straw. The inhabitants of Ulster are also more like the English in their manners and dialect than those of the other three provinces: for as it includes

Uliginous
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Ulster.

Uterior includes within itself the whole, or by far the greater part, of the linen manufactory, the best branch of trade in the kingdom, they have consequently the greatest intercourse with England. An Englishman, in some parts of it, indeed, will imagine himself, from the similarity of their language and manners, in his own country. This province had anciently petty kings of its own. It was first subjected to the English in the reign of Henry II. by John Courcy, the first who bore the title of *earl of Ulster*; but it afterwards threw off the yoke, and was never entirely reduced till the reign of James I. when great numbers of Scots by his encouragement went and settled in it. Of these, most of the present inhabitants are the descendants. This province was the first and principal scene of the bloody massacre in 1641.

ULTERIOR, in geography, is applied to some part of a country or province, which, with regard to the rest of that country, is situated on the farther side of the river, mountain, or other boundary, which separates the two countries.

ULTRAMARINE, a beautiful blue colour used by the painters, prepared from the lapis lazuli by calcination.

ULTRAMONTANE, something beyond the mountains. The term is principally applied in relation to France and Italy, which are separated by the Alps.

ULVA, in botany; a genus of plants of the class of *cryptogamia*, and order of *algæ*. The fructification is inclosed in a diaphanous membrane. There are 17 species; 12 of which are British plants.

They are all sessile, and without roots, and grow in ditches and on stones along the sea-coast. None of them are applied to any particular use different from the rest of the *algæ*, except perhaps the *umbilicalis*, which in England is pickled with salt and preserved in jars, and afterwards stewed and eaten with oil and lemon-juice. This species, called in English the *navel laver*, is flat, orbicular, sessile, and coriaceous.

ULUG BEIG, a Persian prince and learned astronomer, was descended from the famous Tamerlane, and reigned at Samarcand about 40 years; after which he was murdered by his own son in 1449. His catalogue of the fixed stars, rectified for the year 1434, was published at Oxford by Mr Hyde, in 1665, with learned notes. Mr Hudson printed in the English Geography Ulug Beig's Tables of the Longitude and Latitude of Places; and Mr Greaves published, in Latin, his Astronomical Epochas, at London, in 1650. See *ASTRONOMY-Index*.

ULYSSES, king of Ithaca, the son of Laertes, and father of Telemachus, and one of those heroes who contributed most to the taking of Troy. After the destruction of that city, he wandered for 10 years; and at last returned to Ithaca, where, with the assistance of Telemachus, he killed Antinous and other princes who intended to marry his wife Penelope and seize his dominions. He at length resigned the government of the kingdom to his son Telemachus; and was killed by Telegonus, his son by Circe, who did not know him. This hero is the subject of the *Odyssey*.

UMBELLA, an *UMBEL*, in botany: A species of receptacle; or rather a mode of flowering, in which a number of slender footstalks proceed from the same centre, and rise to an equal height, so as to form an even and generally round surface at top. See *BOTANY*.

UMBELLATÆ, the name of a class in Ray's and Tournefort's methods, consisting of plants whose flowers grow in umbels, with five petals that are often unequal, and two naked seeds that are joined at top and separated below.

The same plants constitute the 45th order of Linnæus's *Fragments of a Natural Method*. See *BOTANY*.

UMBELLIFEROUS PLANTS, are such as have their tops branched and spread out like an umbrella.

UMBER, or *UMBRE*, in natural history, a fossil brown or blackish substance, used in painting; so called from *Ombria*, the ancient name of the duchy of Spoleto in Italy, whence it was first obtained; diluted with water, it serves to make a dark brown colour, usually called with us an *hair colour*.

Dr Hill and Mr da Costa consider it as an earth of the ochre kind. It is found in Egypt, Italy, Spain, and Germany; in Cyprus also it is found in large quantities; but what we have brought into England is principally from different parts of the Turkish dominions. But it might be found in considerable plenty also in England and Ireland, if properly looked after, several large masses of it having been thrown up in digging on Mendip hills in Somersetshire, and in the county of Wexford in Ireland: it is also, sometimes found in the veins of lead ore both in Derbyshire and Flintshire.

UMBILICAL, among anatomists, something relating to the umbilicus or navel.

UMBRELLA, a moveable canopy, made of silk or other cloth spread out upon ribs of whale-bone, and supported by a staff, to protect a person from rain, or the scorching beams of the sun.

UMPIRE, a third person chosen to decide a controversy left to arbitration.

UNCIA, in general, a Latin term, denoting the twelfth part of any thing; particularly the twelfth part of a pound, called in English an *ounce*; or the twelfth part of a foot, called an *inch*.

UNCTION, the act of anointing or rubbing with oil or other fatty matter.

UNCTION, in matters of religion, is used for the character conferred on sacred things by anointing them with oil. Unctions were very frequent among the Hebrews. They anointed both their kings and high-priests at the ceremony of their inauguration. They also anointed the sacred vessels of the tabernacle and temple, to sanctify and consecrate them to the service of God. The unction of kings is supposed to be a ceremony introduced very late among the Christian princes. It is said that none of the emperors of Germany took the practice from those of the eastern empire: king Pepin of France was the first who received the unction. In the ancient Christian church, unction always accompanied the ceremonies of baptism and confirmation. Extreme unction, or the anointing persons in the article of death, was also practised by the ancient Christians, in compliance with the precept of St James, chap. v. 14th and 15th verses; and this extreme unction the Romish church has advanced to the dignity of a sacrament. It is administered to none but such as are affected with some mortal disease, or in a decrepit age. It is refused to impenitent persons, as also to criminals. The parts to be anointed are the eyes, the ears, the nostrils, the mouth, the hands, the feet, and the reins. The laity are anointed in the palms of the hands, but priests on the back of it; because the palms of their hands have been already consecrated by ordination.

The oil with which the sick person is anointed represents the grace of God, which is poured down into the soul, and the prayer used at the time of anointing expresses the remission of sins thereby granted to the sick person; for the prayer is this: "By this holy unction, and his own most pious mercy, may the Almighty God forgive thee whatever sins thou hast committed *by the sight*," when the eyes are anointed; *by the hearing*, when the ears are anointed; and so of the other senses *.

UNDECAGON, is a regular polygon of 11 sides.

UNDE.

Umbelliferous
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Undecagon.

* The Sincere Christian
an instructed
from the
Written Word.

Undecem-
vir
Union.

UNDECENVIR, a magistrate among the ancient Athenians, who had 10 other colleagues or associates joined with him in the same commission. The functions of the undecemviri at Athens were much the same as those of the late *prevots de marechaussee* in France. They took care of the apprehending of criminals; secured them in the hands of justice; and when they were condemned, took them again into custody, that the sentence might be executed on them. They were chosen by the tribes, each tribe naming its own; and as the number of the tribes after Callisthenes was but 10, which made 10 members, a scribe or notary was added, which made the number 11.

UNDERSTANDING. See **METAPHYSICS** and **LOGIC**.

UNDERWALD, a canton of Switzerland, and the sixth in rank. It is bounded on the north by the canton of Lucern and by the Lake of the Four Cantons, on the east by the high mountains which separate it from the canton of Bern, and on the west by the canton of Bern. The religion of this canton is the Roman Catholic.

UNDERWOOD, is coppice, or any wood that is not accounted timber.

UNDULATION, in physics, a kind of tremulous motion or vibration observable in a liquid, whereby it alternately rises and falls like the waves of the sea.

UNGUENT, in medicine and surgery, a topical remedy or composition, chiefly used in the dressing of wounds or blisters. See **PHARMACY**, n° 635.

UNICORN, an animal famous among the ancients, and thought to be the same with the rhinoceros. See **RHINOCEROS**.

Sparmann informs us, that the figure of the unicorn described by the ancients has been found delineated by the Snese Hottentots on the plain surface of a rock in Caffraria; and therefore conjectures, that such an animal either does exist at present in the internal parts of Africa, or at least once did so. Father Lobo affirms that he has seen it.

UNICORN-Fish. See **MONODON**.

UNIFORM, denotes a thing to be similar, or consistent either with another thing, or with itself, in respect of figure, structure, proportion, or the like; in which sense it stands opposed to difform.

UNIFORMITY, regularity, a similitude or resemblance between the parts of a whole. Such is that we meet with in figures of many sides, and angles respectively equal, and answerable to each other. A late ingenious author makes beauty to consist in uniformity, joined or combined with variety. Where the uniformity is equal in two objects, the beauty, he contends, is as the variety; and where the variety is equal, the beauty is as the uniformity.

UNIFORMITY, is particularly used for one and the same form of public prayers, and administration of sacraments, and other rites, &c. of the church of England, prescribed by the famous stat. 1 Eliz. and 13 and 14 Car. II. cap. 4. called the *Act of Uniformity*. See **LITURGY**.

UNION, a junction, coalition, or assemblage of two or more different things in one.

UNION, or *The Union*, by way of eminence, is more particularly used to express the act by which the two separate kingdoms of England and Scotland were incorporated into one, under the title of *The kingdom of Great Britain*. This union, in vain attempted by king James I. was at length effected in the year 1707, 6 Annæ, when 25 articles were agreed to by the parliament of both nations; the purport of the most considerable being as follows:

1. That on the first of May 1707, and for ever after, the kingdoms of England and Scotland shall be united into one kingdom, by the name of *Great-Britain*.

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2. The succession to the monarchy of Great Britain shall be the same as was before settled with regard to that of England.

3. The united kingdom shall be represented by one parliament.

4. There shall be a communication of all rights and privileges between the subjects of both kingdoms, except where it is otherwise agreed.

9. When England raises 2,000,000 l. by a land-tax, Scotland shall raise 48,000 l.

16, 17. The standards of the coin, of weights, and of measures, shall be reduced to those of England throughout the united kingdoms.

18. The laws relating to trade, customs, and the excise, shall be the same in Scotland as in England. But all the other laws of Scotland shall remain in force; but alterable by the parliament of Great Britain. Yet with this caution, that laws relating to public policy are alterable at the discretion of the parliament; laws relating to private right are not to be altered but for the evident utility of the people of Scotland.

22. Sixteen peers are to be chosen to represent the peerage of Scotland in parliament, and 45 members to sit in the house of commons.

23. The 16 peers of Scotland shall have all privileges of parliament; and all peers of Scotland shall be peers of Great Britain, and rank next after those of the same degree at the time of the union, and shall have all privileges of peers, except sitting in the house of lords, and voting on the trial of a peer.

These are the principal of the 25 articles of union, which are ratified and confirmed by statute 5 Ann. c. 8. in which statute there are also two acts of parliament recited; the one of Scotland, whereby the church of Scotland, and also the four universities of that kingdom, are established for ever, and all succeeding sovereigns are to take an oath inviolably to maintain the same; the other of England, 5 Annæ, c. 6. whereby the acts of uniformity of 13 Eliz. and 13 Car. II. (except as the same had been altered by parliament at that time), and all other acts then in force for the preservation of the church of England, are declared perpetual; and it is stipulated, that every subsequent king and queen shall take an oath inviolably to maintain the same within England, Ireland, Wales, and the town of Berwick upon Tweed. And it is enacted, that these two acts "shall for ever be observed as fundamental and essential conditions of the union."

Upon these articles and act of union, it is to be observed, 1. That the two kingdoms are so inseparably united, that nothing can ever disunite them; except the mutual consent of both, or the successful resistance of either, upon apprehending an infringement of those points which, when they were separate and independent nations, it was mutually stipulated should be "fundamental and essential conditions of the union." 2. That whatever else may be deemed "fundamental and essential conditions," the preservation of the two churches, of England and Scotland, in the same state that they were in at the time of the union, and the maintenance of the acts of uniformity which established the liturgy, are expressly declared so to be. 3. That therefore any alteration in the constitution of either of these churches, or in the liturgy of the church of England (unless with the consent of the respective churches, collectively or representatively given), would be an infringement of these "fundamental and essential conditions," and greatly endanger the union. 4. That the municipal laws of Scotland are ordained to be still observed in that part of the island, unless altered by parliament; and as the parliament has not yet thought

Unison
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United
Brethren.

proper, except in a few instances, to alter them, they still, with regard to the particulars unaltered, continue in full force.

UNISON, in music. See INTERVAL.

UNIT, or UNITY, in arithmetic, the number one; or one single individual part of discrete quantity.

UNITARIANS, in ecclesiastical history, a name given to those who confine the glory and attribute of divinity to the One only great and supreme God, and Father of our Lord Jesus Christ.

UNITED BRETHREN, or *UNITAS Fratrum*, in ecclesiastical history, a church of which many of our readers will think that an account sufficiently full has been given under the word HERRNHUT. With that account, however, some of the brethren have expressed themselves dissatisfied, in terms which might, without impropriety, be called acrimonious; and the present Editor of this Work, being convinced by his own experience how difficult it is to extract pure and unsophisticated truth from the perplexed writings of angry polemics, resolved, when he entered upon his laborious task, to permit every sect of Christians to plead its own cause, upon the single condition of not loading its opponents with opprobrious epithets. He hopes therefore that the public will forgive him for inserting the following account of the rise, progress, worship, and discipline, of the church of the *United Brethren*, extracted from a tedious manuscript sent to him by one of their clergy. He has faithfully abridged the narrative of his author; but does not consider himself as under any obligation either to maintain its truth, or to convict it of falsehood.

According to this writer, the church of the United Brethren took its rise in Moravia during the 14th century; though in the sentence immediately following this assertion, he says, that it derived its origin from the Greek church in the 9th century, when, by the instrumentality of Methodius and Cyrillus, two Greek monks, the kings of Bulgaria and Moravia being converted to the faith, were, together with their subjects, united in communion with the Greek church. Methodius was their first bishop; and for their use Cyrillus translated the Scriptures into the Sclavonian language.

The antipathy of the Greek and Roman churches is well known; and by much the greater part of the brethren were in process of time compelled, after many struggles, to submit to the see of Rome. A few, however, adhering to the rites of their mother church, united themselves in 1176 to the Waldenses, and sent missionaries into many countries. In 1457 they were called *fratres legis Christi*, or brethren of the law of Christ, because about that period they had thrown off all reverence for human compilations of the faith, professing simply to follow the doctrines and precepts contained in the word of God.

There being at this time no bishops in the Bohemian church who had not submitted to the papal jurisdiction, three priests of the society of United Brethren were, about the year 1467, consecrated by Stephen bishop of the Waldenses in Austria (see WALDENSES); and these prelates, on their return to their own country, consecrated ten co-bishops, or consensors, from among the rest of the presbyters. In 1523, the United Brethren commenced a friendly correspondence, first with Luther, and afterwards with Calvin and other leaders among the Reformers. A persecution, which was brought upon them on this account, and some religious disputes which took place among themselves, threatened for a while the society with ruin; but the disputes were in 1570 put an end to by a synod, which decreed that differences about non-essentials should not destroy their union; and the persecution ceased in 1575, when the

United Brethren obtained an edict for the public exercise of their religion. This toleration was renewed in 1609, and liberty granted them to erect new churches. But a civil war which in 1612 broke out in Bohemia, and a violent persecution which followed it in 1621, occasioned the dispersion of their ministers, and brought great distress upon the Brethren in general. Some of them fled to England, others to Saxony and Brandenburg, whilst many, overcome by the severity of the persecution, conformed to the rites of the church of Rome. One colony of these, who retained in purity their original principles and practice, was, in 1722, conducted by a brother named *Christian David*, from Fulneck in Moravia to Upper Lusatia, where they put themselves under the protection of NICHOLAS LEWIS COUNT OF ZINZENDORF, and built a village on his estate, at the foot of a hill called *Hutberg*, or "Watch Hill" (see HERRNHUT). The count, who soon after their arrival removed from Dresden to his estate in the country, showed every mark of kindness to the poor emigrants; but being a zealous member of the church established by law, he endeavoured for some time to prevail upon them to unite themselves with it, by adopting the Lutheran faith and discipline. This they declined; and the count, on a more minute inquiry into their ancient history and distinguishing tenets, not only desisted from his first purpose, but became himself a convert to the faith and discipline of the United Brethren.

The synod, which in 1570 put an end to the disputes which then tore the church of the Brethren into factions, had considered as non-essentials the distinguishing tenets of their own society, of the Lutherans, and of the Calvinists. In consequence of this, many of the Reformers of both these sects had followed the Brethren to Herrnhut, and been received by them into communion; but not being endued with the peaceable spirit of the church which they had joined, they started disputes among themselves, which threatened the destruction of the whole establishment. By the indefatigable exertions of Count Zinzendorf these disputes were allayed; and statutes being in 1727 drawn up and agreed to for the regulation both of the internal and of the external concerns of the congregation, brotherly love and union was again established; and no schism whatever, in points of doctrine, has since that period disturbed the church of the United Brethren.

In 1735 the Count, who under God had been the instrument of renewing the Brethren's church, was consecrated one of their bishops, having the year before been examined and received into the clerical orders by the Theological Faculty of Tubingen. Dr Potter, then archbishop of Canterbury, congratulated him upon this event, and promised his assistance to a church of confessors, of whom he wrote in terms of the highest respect for their having maintained the pure and primitive faith and discipline in the midst of the most tedious and cruel persecutions. That his Grace, who had studied the various controversies about church-government with uncommon success, admitted the Moravian episcopal succession, we know from the most unquestionable authority; for he communicated his sentiments on the subject to Dr Secker while bishop of Oxford, and from his Lordship they came through a dignitary of the church of England to the compiler of this article. In conformity with these sentiments of the archbishop, we are assured that the parliament of Great Britain, after mature investigation, acknowledged the *Unitas Fratrum* to be a Protestant episcopal church; and in 1794 an act was certainly passed in their favour.

We have elsewhere (see HERRNHUT) mentioned the

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favourable report that was made to the court of Dresden by a deputation which was appointed to examine into the principles and practices of the United Brethren; of which the consequence was, a toleration through all Saxony, as well as in Upper Lusatia. It is, however, acknowledged by the author of the manuscript which we are abridging, that some of the converts to the faith and discipline of the *Unitas Fratrum*, having previously imbibed extravagant notions, propagated them with zeal among their new friends, in a phraseology extremely reprehensible; and that Count Zinzendorf himself sometimes adopted the very improper language of those fanatics, whom he wished to reclaim from their errors to the soberness of truth; but it is added, that much of the extravagance and absurdity which has been attributed to the Count, is not to be charged to him, but to those persons who, writing his *extempore* sermons in short hand, printed and published them without his knowledge or consent. This account of the matter appears indeed extremely probable; and it is but justice to the Count to acknowledge, that he seems to have been very desirous to disclaim the improper expressions, and to vindicate his church from countenancing that impurity which, whether justly or not, was attributed to himself.

This eminent benefactor to the United Brethren died in 1760; and it is with reason that they honour his memory, as having been the instrument by which God restored and built up their church. But they do not regard him as their head, nor take his writings, nor the writings of any other man, as the standard of their doctrines, which they profess to derive immediately from the word of God.

It has been already observed, that the church of the United Brethren is episcopal; but though they consider episcopal ordination as necessary to qualify the servants of the church for their respective functions, they allow to their bishops no elevation of rank or pre-eminent authority; their church having from its first establishment been governed by synods, consisting of deputies from all the congregations; and by other subordinate bodies, which they call *conferences*. The synods, which are generally held once in seven years, are called together by the elders who were in the former synod appointed to superintend the whole unity. In the first sitting a president is chosen, and these elders lay down their office; but they do not withdraw from the assembly, for they, together with all bishops, *seniores civiles*, or lay-elders, and those ministers who have the general care or inspection of several congregations in one province, have seats in the synod without any particular election. The other members are, one or more deputies sent by each congregation, and such ministers or missionaries as are particularly called to attend. Women approved by the congregations are also admitted as hearers; and are called upon to give their advice in what relates to the ministerial labour among their sex; but they have no decisive vote in the synod. The votes of all the other members are equal.

In questions of importance, or of which the consequences cannot be foreseen, neither the majority of votes nor the unanimous consent of all present can decide; but recourse is had to the *lot*. For adopting this unusual mode of deciding in ecclesiastical affairs, the Brethren allege as reasons the practices of the ancient Jews and the apostles; the insufficiency of the human understanding amidst the best and purest intentions to decide for itself in what concerns the administration of Christ's kingdom; and their own confident reliance on the comfortable promises that the Lord Jesus will approve himself the head and ruler of his church. The *lot* is never made use of but after mature deliberation and fervent prayer; nor is any thing submitted to its deci-

sion, which does not, after being thoroughly weighed, appear to the assembly eligible in itself.

In every synod the inward and outward state of the unity, and the concerns of the congregations and missions, are taken into consideration. If errors in doctrine or deviations in practice have crept in, the synod endeavours not only to remove them, but by salutary regulations to prevent them for the future. It considers how many bishops are to be consecrated to fill up the vacancies occasioned by death; and every member of the synod gives his vote for such of the clergy as he thinks best qualified. Those who have the majority of votes are taken into the *lot*, and they who are approved are consecrated accordingly; but by consecration they are vested with no superiority over their Brethren, since it behoves him who is the greatest to be the servant of all.

Towards the conclusion of every synod, a kind of executive board is chosen, and called the *Elder's Conference of the Unity*. At present it consists of 13 elders, and is divided into four committees or departments: 1. The *mission's* department, which superintends all the concerns of the missions into Heathen countries. 2. The *helper's* department, which watches over the purity of doctrine and the moral conduct of the different congregations. 3. The *servant's* department, to which the economical concerns of the Unity are committed. 4. The *overseer's* department, of which the business is to see that the constitution and discipline of the Brethren be everywhere maintained. No resolution, however, of any of these departments has the smallest force, till it be laid before the assembly of the whole *Elder's Conference*, and have the approbation of that body. The powers of the *Elder's Conference* are indeed very extensive. Besides the general care which it is commissioned by the synods to take of all the congregations and missions, it appoints and removes every servant in the unity, as circumstances may require; authorises the bishops to ordain presbyters or deacons, and to consecrate other bishops; and, in a word, tho' it cannot abrogate any of the constitutions of the synod, or enact new ones itself, it is possessed of the supreme executive power over the whole body of the United Brethren.

Besides this general conference of elders, which superintends the affairs of the whole unity, there is another conference of elders belonging to each congregation, which directs its affairs, and to which the bishops and all other ministers, as well as the lay-members of the congregation, are subject. This body, which is called the *Elder's Conference of the Congregation*, consists, 1. Of the *minister* as president, to whom the ordinary care of the congregation is committed, except when it is very numerous, and then the general inspection of it is entrusted to a separate person, called the *Congregation Helper*; 2. Of the *warden*, whose office it is to superintend with the aid of his council all outward concerns of the congregation, and to assist every individual with his advice; 3. Of a *married pair*, who care particularly for the spiritual welfare of the married people; 4. Of a *single clergyman*, to whose care the young men are more particularly committed; and, 5. Of *those women*, who assist in caring for the spiritual and temporal welfare of their own sex, and who in this conference have equal votes with the men. As the *Elder's Conference of each Congregation* is answerable for its proceedings to the *Elder's Conference of the Unity*, visitations from the latter to the former are held from time to time, that the affairs of each congregation, and the conduct of its immediate governors, may be intimately known to the supreme executive government of the whole church.

We have already mentioned the episcopacy of the Brethren,

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thren, and the very limited powers of their bishops; and have to add, that, in their opinion, episcopal consecration does not confer any power to preside over one or more congregations; and that a bishop can discharge no office but by the appointment of a synod, or of the Elder's conference of the Unity. Presbyters among them can perform every function of the bishop except ordination; for if we understand the manuscript before us, he confirms by the laying on of hands young persons when they first become candidates for the communion. Deacons are assistants to the presbyters much in the same way as in the church of England; and in the Brethren's churches deaconesses are retained, for the purpose of privately admonishing their own sex, and visiting them in their sickness: but though they are solemnly blessed to this office, they are not permitted to teach in public, and far less to administer the sacraments. They have likewise *seniores civiles*, or lay-elders, in contradistinction to spiritual elders or bishops, who are appointed to watch over the constitution and discipline of the Unity of the Brethren; over the observance of the laws of the country in which congregations or missions are established; and over the privileges granted to the Brethren by the governments under which they live. They do not consider a regular course of literary education as at all necessary to qualify persons for admission into orders, provided they possess a thorough knowledge of the word of God, what they call *solid Christian experience*, and a well regulated zeal to serve God and their neighbours.

We have mentioned elsewhere (HERRNHUT) their daily meetings in church for worship and edification. On Sunday, besides the public prayers, which are either read from a liturgy or pronounced extempore by the minister, one or two sermons are preached in every church or chapel; and after the morning service an exhortation is given to the children. Previous to the holy communion, which is administered on some Sunday once a-month, and likewise on *Maunday Thursday*, each person who intends to communicate converses with one of the elders on the state of his soul, expressing his desire to partake of the sacrament. The celebration of the communion is generally preceded by a *love-feast*, which is also kept on other solemn occasions. On *Maunday Thursday*, before communion, the Brethren have a solemn *foot-washing*; and at this, and we suppose at other times, they greet one another with *the kiss of charity*. These ceremonies they consider as religious rites, authorised thro' all ages of the church by our Saviour himself and his two apostles ¹ Peter and St Paul ².

* John xii. Our limits will not permit us to give a systematic view of
14 1 Peter the doctrinal tenets of the Brethren. Though they ac-
14. knowledge no other standard of truth than the sacred Scrip-
Rom. xvi. tures, they adhere to the Augsburg Confession, and speak
16. respectfully of the 39 articles of the church of England. They profess to believe that the kingdom of Christ is not confined to any particular party, community, or church; and they consider themselves, though united in one body or visible church, as spiritually joined in the bond of Christian love to all who are taught of God, and belong to the universal church of Christ, however much they may differ in forms, which they deem non-essentials. But the reader who wishes to have a fuller account of this society of Christians, we must refer to *Crauz's Ancient and Modern History of the Protestant Church of the United Brethren*, printed in London, 1780; and to a work entitled *An Exposition of Christian Doctrine as taught in the Protestant Church of the United Brethren*, London, 1784.

UNITED PROVINCES, or UNITED Netherlands, otherwise called the *Republic of Holland*, consist of the seven provinces of Holland, Zealand, Friesland, Groningen, Over-

yssel, Zutphen, and Utrecht. They are bounded on the west by the German Ocean; on the east by the circle of United Provinces, Westphalia; and on the south by Flanders, Brabant, and the duchy of Cleves. They compose the greatest part of the ancient Batavia, whose inhabitants were formerly so much renowned for their valour. Under the Romans they were exempt from imposts and taxes, in consequence of bearing the honourable title of *Allies of the Republic*.

The Netherlands came into the possession of the house of Austria by the marriage of Mary of Burgundy with the emperor Maximilian: but on that prince's resigning the imperial crown, the 17 provinces of the Netherlands devolved of right on Don John of Spain; but he and his successor Philip le Beau dying in a short time after, they, in 1505, fell under the dominion of Charles V. at that time a minor.

At this period the seven provinces, which now compose the Republic of Holland, enjoyed a kind of independence; but the policy and warlike disposition of Charles soon reduced them to obedience. When he resigned the sceptre to his son Philip, the Low Countries were in a most flourishing condition. In this small tract of country were reckoned no fewer than 350 large cities inclosed with walls, and 6300 considerable towns, all become rich by their application to the arts and to commerce. At the same time, the love of liberty was very prevalent among the inhabitants, and they were jealous of every invasion of their rights and privileges. The arbitrary government of Philip was therefore very disagreeable to his subjects in the Low Countries, and the partiality shown on all occasions to the Spaniards soon lost their affections altogether.

The extreme superstition, however, and cruel bigotry of Philip, proved the greatest source of discontent. The doctrines of the reformers had been preached and received with avidity in the Low Countries. A cruel persecution of the reformed had been commenced by Charles V. inasmuch that he is said to have destroyed no fewer than 100,000 persons on account of religion. This cruelty had no effect except to increase the number of heretics; which being observed by Mary queen of Hungary, sister to the emperor, she invited him to the Low Countries, that he might personally behold the bad effects of his cruelty. On this the emperor granted a toleration, but Philip was altogether inflexible. In order to proceed more effectually against the reformed, a court of inquisition was instituted; and under pretence that the three bishoprics, which at that time comprehended the whole country, were too large, 17 of these dignitaries were erected, three with the title of archbishops. To afford sufficient revenues for these, it became necessary to suppress several abbeys, which of itself produced great discontent. But what gave the finishing stroke to the whole was, Philip's announcing his intention of residing constantly in Spain; his appointing the duchess of Parma, his natural sister, to be regent of the Netherlands; and giving her for a counsellor cardinal Graavele, a bloody persecutor of the reformed; at the same time that the provinces were oppressed by the violences of foreign troops, for the payment of whom they were also oppressed by taxes. Three councils were established at Brussels; one to preside over the laws and courts of justice; a second to direct every thing respecting peace or war; and the third to manage the revenues: but still the duchess of Parma was ordered to consult Granvele in every matter, and make him at all times her chief confidant.

The duchess took upon her the government of the Low Countries in the year 1560; and was no sooner arrived at Brussels, than complaints poured in from all quarters against the inquisition, cardinal Granvele, and the new bishoprics. The

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1
Batavians
in high e-
steem un-
der the Ro-
mans.

2
Fall under
the domi-
nion of
Spain.

3
Flourishing
state of the
provinces
at that
time.

4
Persecution
of the Re-
formed.

5
Court of
inquisition
established.

6
Duchess of
Parma ap-
pointed go-
vernress.

7
Universal
discontent.

United
Provinces.United
Provinces.8
Extreme
bigotry of
Philip.9
A general
association
against the
inquisition.TO
The people
break out
into acts of
rebellion.

The dukes endeavoured to allay the ferment by fair words, but in vain. At the head of the malecontents were the prince of Orange, count Egmont, and count Horn, who strenuously insisted on calling an assembly of the States-general, and laying before them the grievances by which the country was oppressed. The event was, that in 1564 the cardinal was obliged to resign his dignity; which yet did not produce any good effect, as he was succeeded by two of his creatures, Barlaumont and Viglius, who trod exactly in his footsteps. They pushed on the inquisition to fresh executions; stigmatized the principal nobility as heretics; and on all occasions showed such violent and intolerable zeal for the Catholic religion, that one of Philip's ministers represented to him the danger there was of a total revolt of the provinces, unless the rigours of persecution were somewhat relaxed. But Philip no sooner received this intelligence, than he replied, "that he had rather be without subjects, than be a king of heretics." Agreeable to this reply, all the obnoxious decrees were enforced with double rigour; upon which the state of affairs became so alarming, that it was thought necessary to send count Egmont into Spain, in order to have a personal interview with the king on the subject. Philip, accustomed to deceit, gave a smooth answer, abated the rigour of his decrees, and ordered the governante sometimes to consult with the prince of Orange. Thus tranquillity was for a time restored; but in the year 1566, it being discovered that a scheme for the total extirpation of the Protestants had been concerted by the queen-mother of France, her son Charles IX. and Isabella queen of Spain, in a conference at Bayonne, matters became worse than ever. That the information received concerning this detestable combination was true, very soon appeared, from Philip's disclaiming all the favourable interpretations which had been put upon his answer to count Egmont, and from his ordering the inquisition to proceed with more fury than ever.—

The consequence of this was a general association against this abominable tribunal, which was subscribed by all orders and degrees of men, Roman Catholics as well as Protestants. The confederates, headed by Henry de Brodenrode, a descendant of the ancient earls of Holland, waited on the duchess of Parma, in such a formidable body, that she was obliged to dismiss them with an absolute promise that their demands should be granted. These demands were, that the inquisition should be abolished, and the edicts against liberty of conscience recalled; and for this she immediately interposed all her interest with Philip. Sir William Temple alleges, that Philip, in consequence of the governante's remonstrances, granted all that was desired, but too late. All other historians, however, agree that he was inflexible, and that the duchess could procure no better conditions than that heretics should from that time forward be hanged instead of being burned. Even this appeared a concession unworthy of the king; the royal name was therefore forbidden to be used.

Before the confederates proceeded to extremities, they sent deputies to Madrid; but, according to some authors, they were refused admittance into the king's presence. It appears, however, that they had found means of representing the true state of affairs to the king, and of informing him that the disturbances proceeded from the detestation in which the inquisition was everywhere held in the Low Countries. Their representations produced no other effect than an equivocal promise, which was evidently never intended to be kept. The governante received orders to proceed against heretics with the utmost severity; upon which the people broke out into acts of open rebellion. In several towns of Flanders the churches were destroyed, images pulled down, and all those acts of violence committed

which are the usual operations of a lawless mob. The principal inhabitants, however, still remained quiet, and even did all in their power to restrain the violence of the commonalty; so that, had Philip made any kind of reasonable concession, the public tranquillity might have been restored. Instead of this, however, a new oath of allegiance was administered by the governante, and all persons were obliged to swear that they would regard as traitors and enemies to their country all whom the king should think proper to proscribe. This extraordinary proceeding was followed by the most cruel persecution that can be imagined; at the same time that the duke of Alva was sent into the Netherlands with an army of 10,000 veteran troops, to put the last hand to the misery of the people, and fully to establish the despotism of the court. Counts Egmont and Horn took the above mentioned oath; but the prince of Orange could by no means be induced to it, and therefore retired into Germany, along with counts Brodenrode and Hoogstrate. Their example was followed by great numbers of all ranks and conditions; and after the arrival of the army commanded by the duke of Alva, such multitudes continued to emigrate, that the duchess of Parma informed the king, that within a few days 100,000 families had left his dominions; that in a short time the country must be depopulated, in which case there would be no occasion for a governante; she therefore begged leave to resign, before she should have the mortification and disgrace of being left alone in the Netherlands.

Philip immediately complied with the request of the princess, and the duke of Alva was appointed to succeed her in the government. It may easily be imagined that the miseries of the people would now become intolerable. The king was a proud and merciless tyrant, set at too great a distance from his subjects to be thoroughly sensible of their calamities, and totally destitute of compassion had he known them ever so well. The new governor was of the same disposition; and the army he commanded was fierce, rapacious, and cruel, desiring nothing more ardently than to enrich themselves at the expence of the inhabitants. The whole country was filled with blood and horror; counts Egmont and Horn were ignominiously executed, and the estate of the prince of Orange was confiscated. These last proceedings drove the people into despair; and they invited the prince to return, in order to take upon him the defence of the country from such insufferable tyranny and oppression.

All this time the prince of Orange, and his brother Louis of Nassau, had been labouring to form alliances for the defence of the liberties of their country. He had represented matters in such a light to the emperor Maximilian, that his Imperial majesty sent an ambassador to Philip, exhorting him to treat his subjects in the Netherlands with less rigour. This embassy was haughtily received; Philip continued his persecutions, and the prince of Orange his preparations for entering the Low Countries. His first efforts, however, were very unsuccessful. A detachment of Germans in the service of the prince attempted to penetrate into Brabant and surprise Ruremond; but were defeated by a detachment from the duke of Alva's army. Another party, consisting chiefly of French, attempted to penetrate into Artois by the way of Picardy; but their officers were arrested by order of Charles IX. Louis of Nassau, however, defeated a body of Spaniards, and killed 600 of them on the spot; but the vigilance of his enemies prevented him from drawing any advantage of consequence from his victory.

The duke of Alva was so much chagrined at the defeat sustained by his party, that he instantly assembled his troops from all quarters. His army then appeared too formidable to be opposed, and the prince of Nassau with count Hoogstrate

11
New oath
of allegi-
ance requi-
red.12
Prince of
Orange re-
tires.13
Duchess of
Parma re-
signs.14
Is succeeed-
ed by the
duke of
Alva.15
Prince of
Orange in-
vited by
the people
to return.16
Hostilities
commence,
to the dis-
advantage
of the
prince.

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17

Prince of
Nassau and
count

Hoogstrate
defeated by
the duke of
Alva.

18

Prince of
Orange de-
feated, and
disbands his
army.

19

Cruelty of
the duke of
Alva.

20

His intol-
erant prin-
ciples and
exactions.

21

Duke of
Alva at-
tempts in
vain to elta-
blish his
new taxes
at Brussels.

22

Briel taken
by the O-
range par-
ty.

23

Duke of
Alva desists
from enfor-
cing his
taxes.

strate retired towards the river Ens. But being hard pushed by the duke of Alva, and mutinies arising among their troops for want of pay, they were soon brought to an action, and totally defeated. The infantry were entirely cut in pieces; the cavalry were saved, but all the baggage and artillery were taken by the enemy. In the mean time, the prince of Orange was hastening to the relief of his distressed allies with an army of 28,000 men; but having the misfortune of being also defeated, and count Hoogstrate killed in the action, his soldiers deserted in such crowds, that he was at last obliged to disband his army and return to Germany. This disaster happened in the year 1569. The duke of Alva resolved to make the most of his time. He entered Brussels in triumph; and let loose his vengeance against all who had in the least assisted, or been supposed to assist, the prince of Orange. All the prisoners taken in the last campaign were put to death: and, not contented with this barbarity, the cruel governor projected nothing less than the total extirpation of the reformed religion, by the destruction of every one who professed it; and of rendering himself despotic, by erecting citadels in all the considerable towns, which were to be garrisoned by his soldiers. He began with Amsterdam, in which he laid the foundations of a strong citadel. The people complained of it as an infringement of their rights, but the duke was deaf to their complaints. At Antwerp he caused his statue to be erected; and here he was figured treading on the necks of two smaller statues, which represented the two estates of the Low Countries. This piece of insolent vanity exasperated the people to a great degree; and they were still farther provoked by a demand of the hundredth part of every man's estate to be paid immediately for the support of the army, besides the tenth of all the merchandize, and the twentieth of all immoveables, to be annually levied as a standing revenue. The provinces remonstrated, and refused to submit to such intolerable exactions: the governor was inflexible; and being incensed at their resistance, he sent the regiment of Lombardy to live at free quarters in the province of Utrecht.

All this time the prince of Orange was employed in laying plans for the deliverance of his distressed country; but in 1571, the duke of Alva growing impatient, ordered the edict concerning the new taxes to be published at Brussels. The city was instantly filled with confusion; the soldiers seized on the goods of the inhabitants by force; tradesmen shut up their shops; and the peasants refused to bring provisions to the market. The states offered to pay a subsidy of 2,000,000 of florins annually in lieu of the intended tax; but their offer was rejected. The drum beat to arms, and orders were issued to hang all who refused to comply. The soldiers were preparing to obey, when news arrived of the surrender of Briel in the island of Voorn, at the entrance of the Meuse, to a squadron of ships of war that had been fitted out by the prince of Orange. Lumey, who commanded the squadron, made a descent on the island from 40 ships, destroyed the churches, broke the images, and executed the priests, but offered no violence to the other inhabitants.

However unimportant the conquest of so inconsiderable a place might appear, it alarmed the duke of Alva, and produced the most extravagant rejoicings in Brussels. The duke regarding it as the harbinger of further opposition, dropped his taxes and executions for the present, and diligently applied himself to suppress the growing spirit of rebellion. He withdrew the garrison from Brussels, and detached it under the command of Maximilian Hermin Bossu, against the ships of war which were called *Gueux*. This officer, endeavouring to force Briel, was defeated by the O-

range faction, and forced to retire with loss to the island of Beyerland. Trifling as this victory might seem, it served to animate the depressed spirits of the enemies to the government. The prince of Orange, sensible of the advantage of possessing this island, exhorted the nobility of his party to fortify and garrison it; his orders were obeyed, by which means he soon became master of Delfshaven, a town situated on the opposite banks of the Meuse. It appeared in Bossu's retreat how unpopular the duke of Alva was in every part of the country. Dordrecht shut its gates against him; Rotterdam refused to admit his troops; but Bossu obtaining permission that they should pass through in separate small divisions, seized the gates, and began a general massacre of the inhabitants. Four hundred perished by the sword, the town was pillaged, the women were ravished, and every possible act of barbarity and inhumanity committed. Re-tribution was soon made by the enemy. Alva had detached Ossorio d'Angulo with a body of forces to secure Flushing, a considerable port in Zealand, and to erect a citadel. The inhabitants denied Ossorio admittance, shut their gates, and seized Pacaneo, a famous engineer, who had come to measure the ground where the citadel was to be erected. Apprehending that attempts would be made to force them to submission, they petitioned Lumey, admiral of the Gueux, for assistance; and he furnished them with 200 men, under the command of Captain Treslong. On the arrival of this reinforcement, the Spanish engineer was hanged, and an unsuccessful attempt made to surprise Middleburg, the capital of the island of Walcheren. Not dispirited by this disappointment, the Zealanders assiduously prosecuted their cruizes upon the Spaniards, and obtained as much wealth as purchased a large store of arms and ammunition at Antwerp. Joined by great numbers of English and Scotch adventurers, they ventured to attack the duke of Medina Celi, sent with a strong squadron to succeed the duke of Alva in the government of the Netherlands. The duke was completely defeated, a great number of his ships were taken, and a booty, amounting to near 1,000,000 livres, was carried off by the Zealanders.

The duke of Alva now ordered a squadron of ships to be equipped at Amsterdam, to bridle the insolence of Lumey and the Zealanders, while he busied himself in raising an army to oppose the prince of Orange and Lewis de Nassau, who were making great preparations in Germany and France. To augment the army in the field, he had draughted most of the garrisons. By this means the prince's friends gained possession of North Holland; and Louis de Nassau was projecting a scheme to surprise Mons, with the inhabitants of which he held a secret correspondence. The design succeeded; which emboldened most of the cities and towns in Holland to declare against the government. The count de Bergues gained over several cities in Overysse, Guelderland, and Friesland. In a word, the revolt became so general, that the duke of Alva soon found he could not long resist the torrent. He now, when too late, published an edict to appease the people, setting forth, that he would consent to remit the most oppressive taxes, if the states could suggest any other means of raising the necessary supplies. He convoked the States-general to meet at the Hague, but his orders were now disregarded; and the States, in contempt of his authority, assembled at Dordrecht, inviting deputies from the prince of Orange, the nobility, and the towns that had declared against the governor. Here money was raised to enable the prince of Orange to begin his march. His forces amounted to 15,000 foot and 7000 horse. He had promised to advance three months pay; and was enabled to perform his engagements by the liberality and public spirit of the States-general and the cities.

He

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24

A party of
his forces

defeated by

the Gueux.

25

The Gueux

take Delfs-

haven.

26

Inhabitants

of Rotter-

dam massa-

cred by the

Spaniards.

27

Duke de

Medina

Celi entire-

ly defeated

by the Zea-

landers at

sea.

28

Most of the

towns in

Holland

declare a-

gainst the

Spaniards.

29

Proceed-

ings of the

States-ge-

neral in fa-

vour of the

prince of

Orange.

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He showed the address with which he could manage and direct the people; and without the name of sovereign of the provinces under his government, he possessed the authority. He presided at all military operations by sea and land; made and disposed of offices at pleasure; assembled the States; and published all ordonnances and regulations relative to the present state of affairs, without controul. However, he conducted matters with the utmost delicacy, and used his power with great moderation, to avoid giving offence to the free spirit of the Hollanders. The Popish religion was banished the churches, and persons of that persuasion were, with great caution, admitted into public employments. Not only the king's revenue and church tythes were appropriated to the public service, but the estates of those who remained firm in their loyalty. In short, the most vigorous measures were taken for resisting the tyranny of Spain; and those persons who had refused the tythes to the government, voluntarily subscribed their all to support a party formed in defence of liberty.

30
His suc-
cesses.

While the States-general were employed in ways and means to maintain an army, the prince of Orange advanced to Ruremonde, which he took by assault, on the refusal of the city to supply him with necessaries. From thence he marched to Brabant, and raised heavy contributions. He took Mechlin, Oudenarde, and Dendermonde; and could not restrain the excesses of the soldiers, who pillaged the churches, massacred the priests, and committed other barbarities. Next he approached to Mons, besieged by the duke of Alva, with design, if possible, to engage him to give battle. The duke baffled all his endeavours to force him, and carried Mons by capitulation. The whole Spanish dominion, however, lately so insolent and exulting, was ready to expire in the Netherlands, had it not been revived by the massacre of the Protestants in Paris.

While the fate of Mons was depending, the states of Holland met at Haarlem, to deliberate on the defence of the province and the prosecution of the war. Amsterdam was in the enemy's hands, which greatly obstructed all their measures. It was therefore determined to besiege it; and the enterprise was committed to Lumey, chief of the Gueux. After putting the States to considerable expence, the project miscarried through Lumey's misconduct. Water was his element, but his vanity led him to display his abilities as a land-officer. He made regular approaches, and was foiled in every attempt.

31
Is obliged
to retire.

The reduction of Mons, and the depression of spirit consequent on the massacre at Paris, obliged the prince of Orange to retire to Holland, and encouraged Alva to invest Dendermonde, Oudenarde, and Mechlin. The latter, being in no condition to resist, opened its gates; but the Spanish soldiers chose to scale the walls, to give an air of assault to the enterprise, and countenance to the horrid barbarities intended. Protestants and Catholics were massacred without distinction. The town was pillaged, and the booty estimated at 400,000 florins. All the other towns were evacuated by the garrisons, and loaded with heavy impositions by Alva. As to the prince, he had now removed the seat of war into the province of Holland. Only this province and Zealand remained firm to their engagements; the rest, overwhelmed with consternation, capitulated on the best terms they could procure from the government. However, the country being strong by its nature and situation among the waters, and more so by a fierce, rough, and sturdy people, proud of their ancient fame, and the most implacable enemies of Spanish tyranny, it was determined to make the most vigorous resistance. Frederic de Toledo was dispatched by Alva to begin the operations in Holland. He had already reduced Zutphen and Guelderland; and, flushed with

32
Success and
cruelty of
the duke of
Alva.

success, appeared before Waerden, which he summoned to admit a garrison. The burghers replied, that they were intrusted by the king with the defence of the place, and could not receive a military force without violence to their privileges and engagements. They soon had reason to repent their firmness: the town was taken by surprise; and all the burghers, assembled in the great church to take the oaths of fidelity to the king, were wantonly butchered. Infants, old men, women, and the sick, were all put to the sword, without pity or remorse; and of all the barbarities hitherto committed, this was the most horrible. It was imagined that the terror inspired by such instances of severity, would reduce the people to obedience, and shake the obstinacy of the other towns. The contrary effects were produced; rage and despair took possession of every breast; and all determined to suffer the last extremities rather than submit to so cruel a tyranny.

Having finished this tragedy, Frederic went to Amsterdam, to deliberate with the officers of the army about the siege of Haarlem. Here it was determined, before they proceeded to extremities, that the city of Amsterdam should write to the magistrates, exhorting them, in the most pathetic terms, to submit, rather than incur the punishment inflicted on Waerden. The council of Haarlem met to take this letter into consideration. Some were for soliciting an immediate reinforcement from the prince of Orange; and others, who apprehended the prince was too weak to afford the necessary relief, were for making the best terms possible with the king. Those of the latter opinion were the magistrates. Accordingly, without consulting the burghers, deputies were dispatched to Frederic to stipulate conditions. In their absence, Ripperda, a gentleman of Friseland, strongly attached to the prince of Orange and the cause of liberty, assembled the chief burghers; and so animated them against the Spaniards, that they resolved to stand a siege, and suffer all the horrors of war, rather than submit. They sent to the prince of Orange to acquaint him with their determination, and to implore assistance. Four companies of Germans were detached to reinforce the garrison of Haarlem; and the deputies, on their return, were seized as traitors to their country, sent to the prince of Orange, and by his order beheaded. Frederic was preparing to compel the burghers to submission. On the 19th of December he invested the town, after carrying Sparendam fort by assault, with great loss and slaughter of his soldiers. A variety of errors were committed in the attack, in the defence, and manner of succouring Haarlem. The assailants and defendants had equally shown themselves ignorant of the art of war, and implacable in their resentment. The prince of Orange used every expedient to relieve the town; but all his attempts were frustrated by untoward accidents, and the vigilance of the Spaniards. At last, quite spent with fatigue, despairing of relief, weakened by losses, and totally exhausted of provisions and ammunition, the burghers of Haarlem surrendered upon more favourable terms than they could well expect. A few only of the most obstinate were executed; the rest were pardoned on taking an oath of fidelity, and paying an acknowledgment of 15,000 florins.

33
Haarlem
besieged.

During the siege of Haarlem, the Zealanders were performing glorious achievements by sea, and gaining victories over the Spanish naval armaments. All the efforts of the governor of Antwerp could not prevent their carrying off a great number of ships out of the harbour. To revenge the insult, and relieve Middleburg and Rammekins blocked up by the Zealanders, he equipped a squadron, and gave battle to Wertz, the Zealand admiral, but was defeated. After repairing and augmenting his fleet, he again set sail with sixty large vessels, encountered a squadron of Zealanders much

34
And taken.35
Successes of
the Zea-
landers by
sea.

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much inferior in strength, and met with his former fortune. Most of his ships were sunk or taken; but he found means to push into Middleburg, with the broken remains of his squadron, to the great joy of the garrison, now reduced by the scarcity of provisions to the last extremity. D'Avila's disgrace did not end here; for, on his return to Antwerp, he was a third time attacked and defeated, with considerable loss, by Wertz, who thus repaired the disappointment of an unsuccessful attempt made on Tolen.

36
The Spaniards re-
pulsed be-
fore Alca-
mar.

Soon after the reduction of Haarlem, Alva, perceiving that his severity answered no other purpose than irritating the people more against the Spanish government, published a proclamation, couched in the most soothing terms: but the people were not disposed to confide in promises so often violated, nor to throw themselves on the clemency of a prince and governor who had shown themselves inflexible, implacable, perfidious, and inhuman. They now expected the worst that could happen, and bid defiance to fortune. The Spaniards were preparing to invest Almar, and the Hollanders put every means in practice to resist them. Eight months pay was due to the garrison, who began to mutiny; but contributions were raised, which silenced their clamours. Frederic of Toledo, with 16,000 men, sat down before a town fortified by no regular works, and defended only by 300 burghers, and 800 soldiers, in extreme want of provisions, and without the prospect of relief. Sonoi, the governor, despairing of being able to sustain a siege, wrote to the prince of Orange, that a place destitute of troops, provisions, ammunition, money, and every necessary, ought to be evacuated, and the few soldiers in garrison, and the burghers, saved from falling into the hands of the enemy. But the prince of Orange so animated them by a letter, that, to a man, the townsmen, governor, and soldiers, determined to sacrifice their lives, and spill the last drop of their blood in the breach. Perseverance had made the Zealanders masters of Rammekins, contrary to all hope and probability; the same virtue, the prince observed, might save Almar, a town of the utmost consequence to the cause of liberty. What particularly inspired the defendants with courage, was the prince's good fortune in surprising Gertrudenburg. Frederic pushed the siege with great vigour. He ordered the inhabitants of Haarlem to work in the trenches, and sustain the first fire of their friends and countrymen. On the 18th of September, a battery of 20 pieces of heavy cannon began to play; a breach was soon effected; the assault was given, and repulsed with vigour, though sustained by the bulk of the Spanish army. From a Spanish officer taken, the garrison were informed, that Alva had given orders to retire, in case he failed in the third assault; but if he succeeded, to put all to the sword. Their courage was whetted by this account, and preparations were cheerfully made for withstanding the utmost efforts. Frederic was foiled in every attempt; the assailants were driven from the breach with prodigious slaughter; the Spanish soldiers refused to mount the walls; in a word, the siege was raised, and the town relieved, to the exceeding joy of the prince of Orange, and great mortification of Alva.

37
They are
defeated at
sea.

This advantage was attended with another of less importance, but which equally served to inspirit the Hollanders. The duke of Alva's grand fleet, equipped with great labour and expence, was defeated by the Zealanders. Though the action did not prove decisive, it greatly chagrined the duke, as Bossu, one of his best officers, was taken prisoner, and his fleet afterwards dreaded to look the enemy in the face.

Notwithstanding this success, the affairs of the States were yet in a most precarious situation; and their ability to support themselves appeared in the highest degree proble-

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Provinces.

matical. The Duke of Alva had resigned the government, and his successor Don Louis de Requesnes had orders to push the war with vigour, while his antagonists prepared for the most obstinate resistance. The first advantage appeared on the side of the prince of Orange, by the surrender of Middleburg. But this was soon balanced by the defeat and death of prince Louis of Nassau. The Spaniards, however, were prevented from pursuing the advantage they had gained, by a mutiny among their troops. This mutiny took place on a regular and well-concerted plan. The soldiers deposed all their officers, appointed new ones, and established a sort of community, vesting one of their number with the chief authority. The distresses of the Spaniards on account of this tumult were likewise augmented by a victory gained by the Zealanders at sea; when almost 40 of the Spanish ships were taken or destroyed. Philip then perceiving that numberless difficulties would attend the reduction of the provinces by force, published an act of grace; but in such a limited manner, that it was unanimously rejected. Requesnes then determining to close the campaign with some remarkable exploit, laid siege to Leyden. The city was reduced to the utmost distress for want of provisions; the whole country was laid under water; and they could receive no relief except what was obtained by boats forcing themselves through the enemy to the city. In short, they were reduced to the brink of destruction, when a violent south-west wind drove the inundation against the works of the besiegers with such violence, that they were obliged to relinquish the enterprize for fear of being entirely swallowed up. In their retreat they were attacked by the garrison, and 500 of them destroyed. This disappointment so provoked the Spanish soldiery, that they deposed Valdes the commander, whom they had chosen for themselves, and proclaimed their old one: a second mutiny ensued, and they marched in a tumultuous manner to Utrecht. Here, however, they met with a very unfavourable reception. Barlaimont the governor declared them rebels and traitors to their king; and gave free liberty to every one to massacre them wherever they could be found. The mutineers attempted to set fire to the gates; but being repulsed, and their leader slain, they capitulated, were received into favour, and sent into winter-quarters.

38
Mutiny in
the Spanish
army.

The year 1575 commenced with some negotiations for peace; but these proving ineffectual, though the emperor interposed his mediation as far as possible, the war was renewed with redoubled fury. Fortune now declared in favour of the Spaniards; and the States were reduced to such despair, that they began seriously to think of making an offer of the provinces to some Protestant power who might be able to defend them against the tyranny of the Spaniards. This offer was made to queen Elizabeth of England; but she declined it, for political reasons. A negotiation was even set on foot for this purpose with France, in favour of the duke of Anjou; but it ended in nothing besides the advantage of establishing a mart at Calais for the disposal of the prizes made by the Gueux. Philip, however, notwithstanding his power, had the utmost difficulty in supporting the expence of the war. He had already borrowed more than 40,000,000 crowns from the Spanish and Genoese merchants, and the interest still unpaid now amounted to as much as the capital. The war had besides cost a greater sum sent in specie from Spain and the Indies, which, with the immense losses occasioned by the stagnation of trade in the Netherlands, had quite exhausted the treasury. Large arrears were due to the troops; they were every day mutinying, and some broke out into actual rebellion. To remedy these evils, Requesnes demanded a supply of the provinces; and they answered him, by requiring restitution

39
The States
offer the so-
vereignty
to queen
Elizabeth,
&c.40
Philip dis-
tressed in
his finan-
ces.

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41
Confusion
in the Spa-
nish affairs.

of their privileges, and dismissal of the Spanish troops. Flanders, in particular, paid the desired subsidy, by balancing it against half the damages the province sustained from the misconduct of the governors, and the wars wantonly and unnecessarily excited. While this affair was in agitation, Requesnes died of an ardent fever: the council of state assumed the administration, and the prince of Orange took the opportunity of the confusion that ensued to lay the first foundation of the Pacification of Ghent, by which his affairs were considerably retrieved, and the greatest blow given to the court of Spain she had yet sustained. All now was anarchy in the Low Countries. The garrison of Ziriczee mutinied for want of pay; and to appease them, the council of state sent 100,000 livres, which the Walloon regiments under Madragon seized upon, after expelling the Spanish soldiers, and wounding and murdering their officers. This did not unite the Spanish mutineers among themselves; they turned out the few remaining officers, and made new appointments. Joining with the garrison of Lillo, they marched, to the number of 2000 men, towards the capital; committed horrible outrages; overwhelmed the inhabitants of Brussels with consternation; and, upon the 26th of July, seized upon Alost, confined the principal burghers, and hanged up a king's officer. The most favourable conditions were offered by the council of state, in order to appease the tumult, and provisions were sent to the mutineers. This created suspicion in the inhabitants of Brussels, that the mutiny was excited by the connivance of the council, with a view of ruining the provinces, without incurring the resentment and odium consequent on any appearance of legal oppression. They arrested the council, declared the Spaniards rebels, and took measures in concert with the other cities and provinces for expelling foreigners out of the Netherlands. A confederacy to this purpose was formed between the provinces of Hainault, Artois, and Flanders, to which all the rest except Luxemburgh acceded; and Don John of Austria, who had entered the Low Countries in quality of governor and successor to Requesnes, was obliged to live in obscurity in Luxemburgh until the storm should subside.

42
Antwerp
taken and
pillaged.

The prince of Orange was all this while profiting by these commotions. He had long laboured to have the States-general convoked; and he now saw them not only assembled, but preparing to make head against the Spaniards, by a strange vicissitude of fortune, arising from accidents which all his penetration and sagacity could not foresee. United in councils against the common enemy, every measure was taken for reducing the citadels of Ghent, Antwerp, and Maestricht, the chief places in the hands of the Spaniards, and what must principally contribute to their expulsion. Ghent citadel was taken on the 27th of November, by the assistance of a strong reinforcement of troops and artillery sent by the prince of Orange. At Antwerp the states of Brabant were less successful. The citadel was vigorously attacked; but the mutineers at Alost entering the citadel to assist their countrymen, a sally was made, the besiegers were driven from their trenches, great part of the town was consumed by fire, and the rest pillaged for three days with every kind of insolence and brutality, at a time when Antwerp was the most flourishing and populous city in the Netherlands, and indeed among the most wealthy in Europe. It is affirmed that the treasure carried off amounted to four millions, besides an infinity of rich merchandize. This terrible calamity united Papists and Protestants without distinction in a confederacy, and co-operated with the measures of the prince of Orange to form the Pacification of Ghent: which was a confederacy of all the provinces to expel foreign soldiers; to restore the ancient form of government; to refer matters of religion to the several

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states of the provinces; for ever to unite the other 15 United provinces in the same common interest with Holland, Zeeland, and the prince of Orange; to renew the commerce and amity between them; to assemble the states in the manner practised under the house of Burgundy and Charles V.; to suspend all the rigorous edicts of the duke of Alva on the subject of religion, until the States general should take the matter into consideration; to release all the natives made prisoners, mutually, without ransom; and to restore all things upon the same footing as before the war, and the tyrannical government of the duke of Alva.

The States general began with soliciting aid from the queen of England. Their ambassador had a gracious reception; and Elizabeth advanced them 20,000l. sterling, on condition that the French should not be invited into the Netherlands, that they would accept of reasonable terms of accommodation if offered, and that the loan should be repaid the ensuing year. Next a cessation of hostilities was agreed upon with Don John, upon his assurances that every reasonable request of the provinces should be granted. On the 27th of December, deputies were sent with proposals to Don John to disband the foreign troops: but he desired to know what security the States would give for their allegiance after the departure of the Spanish forces; and remonstrated against the unreasonableness of disarming the king, while his rebellious subjects were in arms, and ready to seize the first opportunity of deserting their obedience. He likewise demanded security with respect to religion; and insisted so warmly on this head, that it was obvious he had no inclination to part with the Spanish army before the provinces of Zeeland and Holland embraced the Catholic religion. After much altercation, necessity at length obliged Don John to grant all that was required, to confirm the Pacification of Ghent, and dismiss the Spanish army. He had the king's authority for his proceedings; the treaty was proclaimed at Brussels and Antwerp on the 17th of February; and Don John immediately acknowledged governor, and the king's lieutenant of the Netherlands.

It must be observed, however, that when this edict was signed, the provinces of Holland and Zeeland, by the advice of the prince of Orange, made the following objections, viz. that the States-general had not established the right of assembling this sovereign tribunal in the persons originally invested with that power by the constitution; that in some particular instances they had suffered an infraction of their privileges; that the Spanish troops were allowed to carry off the immense wealth they had acquired in the Netherlands, and by the destruction of the city of Antwerp in particular; that no stipulation was made in favour of those dispossessed of their estates, &c. For these reasons the States and the prince refused to sign the edict, though they consented to all the articles that did not contradict those specified. This raised a contention, by which the public peace was soon broken. Don John was strenuous in recommending violent measures against the prince and his party. To this purpose he wrote a letter in cipher to the king; but this letter fell into the hands of Henry IV. of France, who transmitted it to the prince of Orange. Escovedo, secretary to Don John, was next sent into Spain with a message to the same purpose; but the governor becoming impatient for his return, left the country himself, under pretence of complimenting Margaret queen of Navarre on her journey to Spaw. In this expedition he seized on the citadel of Namur: but attempted to justify his conduct to the States, by representing, that he was under a necessity of retiring to a place of safety, while he saw the flames of war and rebellion ready to break out all around him; and concluded with desiring the States to disarm the burghers of Brussels, who were closely attached to the

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Provinces.

43
Pacification
of Ghent.

44
The States
receive as-
sistance
from queen
Elizabeth.

45
Don John
accedes to
the pacifi-
cation of
Ghent.

46
Objections
made to
the pacifi-
cation by
the pro-
vinces of
Holland
and Zea-
land.

47
Hostilities
 recommen-
ced.

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Provinces.48
Don John
deposed.49
New treaty
with queen
Elizabeth.50
Amster-
dam con-
cludes a
treaty with
the prince
of Orange.51
Revolution
in Guelder-
land,

prince of Orange. This letter was answered by an invitation from the States to return; promising at the same time, that they would, to the utmost of their power, bring to punishment all those who should form any designs against him. This, however, was not only refused, but the whole tenor of his conduct afterwards showed, that he was resolved to commence hostilities, and that he was encouraged to do so by Philip. The event was, that Don John was deposed from his dignity, the archduke Matthias was appointed governor-general, and preparations were made for a new and vigorous war. The Spanish troops were ordered to assemble in Naples and Milan; levies were made in Burgundy and Luxemburgh; and a resolution was taken of supporting Don John with the whole power of the Spanish monarchy. To oppose this formidable power, the States, in 1578, entered into a new treaty with the queen of England; by which that princess agreed to advance them 100,000l. Sterling, and to assist the provinces with 5000 foot and 1000 horse; on condition that the loan should be repaid with interest in eight months; that certain towns should be ceded to her in security; and that the States should defray the expence of transporting their troops, and take them into pay, while they acted in their service. Elizabeth, however, afterwards departed from these conditions, under pretence that the French would suspect her having some designs on the Netherlands, and would for that reason unite their forces with those of Spain against her. Instead of the English troops, she now proposed to send John Casimir, count Palatine, with 3000 foot and 3000 horse; refusing at the same time to pay the money stipulated, until the States had consented to this alteration.

Before this treaty was concluded, Don John was joined by an army of 16,000 foot and 2000 horse, all chosen veterans, commanded by Alexander Farnese, duke of Parma, the best officer in the Spanish service. Being thus superior to the prince of Orange, the Spaniards gained several advantages; which, however, were more than balanced by the loss of the city of Amsterdam. This place had been closely blocked up for several months by sea and land, and at last concluded a treaty with the friends of the prince of Orange; by which it was stipulated, that the Protestants should hold their religious meetings without the walls, and have a burying-place within; that the garrison should be disbanded, and 600 men, commanded by the burghers, levied for the defence of the city; that all persons banished on account of religion should be recalled; that Amsterdam should enjoy all its ancient privileges; and that all vacancies in public employments should be filled without distinction of party or connection. This capitulation, however, was soon after broken; the Catholic magistrates were driven out of the city, attended by the priests and Popish clergy of every denomination; the images were pulled down, and only the reformed clergy suffered to preach publicly. Some ineffectual negotiations next took place; after which the States, sensible that the misfortunes and losses in the winter arose from the irresolution of the provincial states, vested the archduke, the council of state, and the prince of Orange, with a power of levying what number of troops they should think necessary, and disposing of them as they thought proper, without referring to the states in every particular: they only recommended that they would proportion the expences to the revenue, which at that time amounted to 600,000 livres. About this time a revolution, greatly beneficial to the common cause, was effected in Guelderland; John of Nassau, brother to the prince of Orange, had been appointed governor of this province. Upon entering on the administration, he perceived that the whole conduct of affairs was in the hands of persons strongly affected to king Philip and the Catholic religion; most of the cities profes-

sed Popery; and the count, who had sworn to the pacification of Ghent, was restrained from attempting any change in religion. The face of affairs, however, took a sudden turn; John acquired great popularity, and soon discovered that foreigners were the leading persons. By his artifice and policy he stimulated the people against them; they were deprived of their seats in the provincial states, and turned out of their offices in the government of the cities. Thus Nassau obtained the chief direction, and was able to co-operate with the measures planned by his brother. Another revolution happened in Groningen, of which the sieur de Billy was governor. Billy was by birth a Portuguese, by religion a Catholic, and consequently a dependent on the court of Spain: he refused to accede to the union of the provinces, and the States-general found it necessary to send to him Francis Martin Stella, with proposals for signing the pacification of Ghent. Billy, suspecting that the deputy's real design was to excite a revolt in the province, put him to the torture to extort confession; after having first wounded him with his own hand. The deputy bore the most excruciating tortures with firmness; and having a surgeon to dress his wound to enable him to undergo a second trial, he communicated something in the Greek language, which the surgeon soon made public: in consequence, the mob assembled, rescued Stella, declared for the pacification of Ghent, and obliged Billy to quit his government. The change of councils in these two provinces was of the utmost service to the confederacy; and would have enabled the province to have encountered the whole power of Spain, had not their affairs been distracted by dissensions among themselves.

At last the prince of Orange, perceiving that little confidence was to be placed in the unanimity of provinces rent by faction, different in religion, and divided by ambition, political maxims, and private interest, formed the scheme of more closely uniting the provinces of which he was governor, and cementing them with those more contiguous, in which the Protestant interest prevailed. Such an alliance was subject to fewer difficulties than attended the more general one of uniting all the provinces; it was in fact the only measure that could be proposed with safety, and it was prosecuted with that alacrity and address for which William was deservedly celebrated.

On the 23d of January 1579, deputies from the provinces of Holland, Zealand, Utrecht, Friesland, Groningen, Overijssel, and Guelderland, met at Utrecht, and signed the alliance ever since known by the name of the *Union of Utrecht*, the basis of that commonwealth so renowned by the appellation of the *United Provinces*. This treaty of alliance was founded upon the infraction of the pacification of Ghent solemnly acceded to by Philip, and the late invasion of certain towns in Guelderland. It was not hereby intended to divide the seven provinces from the other ten, or to renounce the pacification of Ghent; its object was to preserve the liberty stipulated in that pacification, by more vigorous operations, and united councils. The chief articles of this union are the following.

The seven provinces shall unite themselves in interest as one province, never to be separated or divided by testament, donation, exchange, sale, or agreement; reserving to each particular province and city all its privileges, rights, customs, and statutes. In all disputes arising between either of the provinces, the rest shall interpose only as mediators. They shall assist each other with life and fortune against every foreign attempt upon any particular province, whether to establish sovereignty, the Catholic religion, arbitrary measures, or whatever else may appear inconsistent with the liberties of the provinces and the intention of the alliance. All frontier towns belonging to the United Provinces shall,

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Provinces.52
And in
Groningen.53
Union of
Utrecht.

United
Provinces.United
Provinces.

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His suc-

cesses.

if old, be fortified at the expence of the provinces; if new, at the joint expence of the union. The public imposts and duties shall be farmed for three months to the highest bidder, and employed with the king's taxes in the public service. No province, city, or member of the union, shall contract an alliance with any foreign prince or power, without the concurrence of all the other members. Foreign powers shall be admitted into the alliance, only by consent of all the contracting parties. As to religion, the provinces of Holland and Zealand shall act in that particular as they think advisable; the rest shall adhere to the purport of the edict published by the archduke Matthias, which prescribed that no man should be oppressed on the account of conscience. All the inhabitants, from the age of 18 to 60, shall be trained and disciplined to war. Peace and war shall be declared by the unanimous voice of all the provinces, other matters that concern the internal policy shall be regulated by a majority. The states shall be held in the usual constitutional manner, and coinage shall be deferred to future determination. Finally, the parties agree, that the interpretation of these articles shall remain in the States-general; but in case of their failing to decide, in the stadtholder.

This alliance was so universally approved, that in a short time the cities of Ghent, Nimeguen, Arnheim, Leewarden, Venlo, Ypres, Antwerp, Breda, Bruges, with several other towns, besides a great number of noblemen and persons of distinction, embraced and signed the union. Thus the foundation of a commonwealth was laid, but in a fluctuating and uncertain state of affairs, when men were actuated by different passions, views, and interests; intimidated by the great strength of the Spanish monarchy, and supported chiefly by a zealous adherence to liberty, and firm resolution to perish in defence of freedom. The first coin struck after this alliance is expressive of the situation of the infant republic. Here was represented a ship labouring amidst the waves, unassisted by sails or oars, with this motto, *Incertum quo fata ferant*.

54
First coin
struck by
the republic
of Hol-
land.

It was expected, that the important object of this alliance would have attracted the attention of the Walloons, and indeed of all the Catholic inhabitants of the Netherlands: it in fact did so, but in a different manner from what was imagined. The Walloons not only refused to accede to the union, but they made the strongest remonstrances to the States-general upon the danger, impropriety, and illegality of such a confederacy. It appears from Strada and Bentivoglio,

55
Intrigues
of the duke
of Parma.

that the duke of Parma was at the bottom of their intrigues. He stimulated and prompted their measures, inspiring them with a jealousy of the Protestant designs on the Catholic religion. In the end, he contracted an alliance with them; and thereby confirmed by his own example the legality and necessity of the union of Utrecht. Immediately they began levying an army; but still kept up appearances with the confederated provinces, though it was obvious that hostilities must soon commence. To prevent the effusion of blood, the emperor, as mediator, set on foot another negotiation; but Philip would allow no reasonable terms of accommodation, and give no security for liberty of religion. Instead of granting equitable conditions, he laboured to detach the prince of Orange from the union; made him extraordinary proposals; offered to restore him to all his estates, indemnify his losses, raise him to the height of power, and give him the first place in his esteem and favour. But William was too wise to rely on the promises of a king who had shown himself perfidious. He determined to share the fate of the United Provinces, to fulfil his engagements, and the hope conceived of his conduct.

While the prince of Orange was busied in conciliating factions, forming alliances, and strengthening the union,

the duke of Parma was taking measures to disconcert his projects, and reduce the provinces to the king's obedience. He dispatched Gonzaga and Mondragon with 8000 men to lay siege to Mairien. The town was taken by assault; the governor hanged; and 45 of the chief inhabitants were tortured to death, for having valiantly defended themselves, and faithfully discharged their duty. It is said the duke of Parma disavowed this bloody proceeding, so inconsistent with the character of a hero. After some farther considerable advantages obtained in the neighbourhood of Ruremonde, the king's army insulted Antwerp, where the archduke and the prince of Orange then resided. The States army was intrenched near Borgerhont, a post attacked without success by the duke of Parma, after a brisk skirmishing of two hours between the armies. La Noue, however, the general of the states army, not choosing to expose himself to continual alarms from the enemy's cavalry, retired under the cannon of Antwerp.

On La Noue's retreat, the duke of Parma invested Maestricht. The siege began on the 8th of March, and continued without remission to the 29th of June. This defence was deemed very extraordinary, as the fortifications were in bad order, the garrison slender, and the place but poorly provided with the necessaries of a siege. One Sebastian Tappin, an engineer by profession, a Protestant, and a brave and alert soldier, by his indefatigable vigilance raised continual obstructions to the duke's approaches. The garrison had sustained frequent assaults, and made divers bloody sallies, by which they were so much fatigued, that during a parley the town was surprised and a great many soldiers were put to the sword; but Tappin was saved by favour of the duke of Parma, who gave strict orders that he should have quarter. For three days Maestricht was a scene of the utmost desolation and horror, the Spanish soldiers committing every excess and enormity, in despite of all the endeavours of the general to restrain their licentiousness, and maintain discipline. With such diligence did the duke apply himself to this siege, that, unable to support the fatigue, he was seized with a fever, which had near proved fatal. His situation inspired the enemy with fresh courage. They ventured to appear in the field; reduced Alost, and some other places of little consequence; but could not prevent the loss of Menin taken by assault, though it was soon after retaken by the prince of Orange. In Brabant the states likewise obtained some advantages, though of too unimportant a nature to merit attention. The truth is, all the United Provinces were in a deplorable situation; and their trifling successes were owing entirely to accident, or the duke of Parma's illness. Several provinces contributed nothing to the common cause; others furnished but a small proportion of the taxes agreed upon at the union. The army had large arrears due, and lived at discretion; in a manner more oppressive to the people than taxes to the amount of their regular pay. The people clamoured against the states; they threw the blame on the officers for relaxing in the point of discipline; and the officers recriminated, alleging, that the fault was in the states, who failed in performing their engagements to the army. All was in confusion; but as no person would acknowledge his error, there appeared little hopes of amendment. In a word, nothing besides the same distress in the Spanish army could have prevented the duke of Parma from reducing the revolted provinces to accept any terms he should think fit to prescribe. He was equally in want of money; and his late treaty with the Walloons required that he should dismiss all his foreign troops in the space of six weeks after the publication of the treaty. His situation indeed was so deplorable, that he requested leave to resign his command, and retire with the foreign soldiers to Italy;

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Maestricht
taken, and
the inhabi-
tants massa-
cred.58
Distressed
situation of
the republic.

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Provinces.

but the court of Spain had too much confidence in his ability to entrust so important a charge to another. In this state of affairs the animosity of the parties remained, without the power of showing their resentment. The states were resolute, but unable to defend their liberties. Philip was determined, but too weak to be despotic; and both were obliged to content themselves with publishing bitter remonstrances against each other.

At last the prince of Orange renewed the treaty with the duke of Anjou. The queen of England was again offered the sovereignty, but she declined it for political reasons. The duke of Anjou was, however, opposed by a great number of the Reformed, on account of the share his mother had in the horrid massacre of the Protestants at Paris. All arguments to remove their prejudices were in vain. Anjou was a Roman Catholic, and that alone was sufficient to render him detestable. The prince of Orange urged the necessity of receiving the prince. Theologians and civilians allowed that it was lawful to have recourse in extremity to a Papist, but the people continued obstinate. This determined the prince of Orange to have recourse to the States-general, to whom he sent a long remonstrance, pointing out the causes why the confederacy did not produce the intended effect; and exhorting them to re-consider the affair respecting the duke of Anjou. In consequence, the States-general referred the prince's remonstrances to the provincial states and cities; and after long deliberations, and warm debates, it was at length determined, in 1380, to call in the duke of Anjou, as the only resource in so great a calamity. Accordingly

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Duke of
Anjou cho-
sen sove-
reign.

the year began with a solemn treaty, whereby the United Provinces renounced their allegiance to Philip, and acknowledged Francis Hercules de Valois, duke of Alençon and Anjou, for their sovereign. The treaty consisted of 27 articles, of which this we have mentioned was the chief. Deputies were sent to the duke of Anjou, to explain the articles, and congratulate him on his accession. As to the archduke Matthias, finding himself unsupported by the emperor, the empire, and the numerous friends whom he expected would have joined him on his elevation, he expressed no resentment at the conduct of the provinces, which with great moderation he attributed to necessity. He only demanded to know their intention with respect to his own person; and the states made their apology, by representing the situation of their affairs, assuring him of their esteem, permitting him to reside in the Netherlands as long as he thought convenient, and highly applauding the prudence and equity of his conduct during his administration. As to the provinces of Holland and Zealand, they were left wholly in the hands of the prince of Orange, whose power as stadtholder was in no respect limited by the duke's sovereignty. After all, Grotius affirms, that the duke's authority was merely nominal, that the real power devolved on the prince of Orange, whose name, however, was used in all public acts only in a subaltern capacity. It was apparent indeed to the French, that William concealed ambitious views under the cloak of patriotism; but it was not convenient to discover their sentiments.

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Prince of
Orange
proscribed.

When the king of Spain was informed of this open defection of the Provinces, he attributed the whole to the prince of Orange, and proceeded directly to proscribe him; he confiscated his estate, upbraided him with ingratitude, and attempted to stain his character with ignominy. He even promised a reward of 25,000 crowns to whoever should bring him the prince of Orange dead or alive; the same to his heirs, in case the person perished in the enterprise; and he declared all those proscribed, their estates confiscated, their honours and dignities abolished, who adhered to William a month after the publication of this edict.

The prince of Orange did not silently pass over this proscription. He employed one Villiers, a Frenchman, to refute the edict: his answer was well received, and is recorded by historians as a proof of the spirit, the equity, the prudence, and the moderation of the prince. However, when it was proposed to the states for their opinion, with a request they would publish it in their own name, they declined it; assigning for a reason, that it contained some facts too little known to be credited, and perhaps too much acrimony and resentment against a prince whose power they still dreaded. With these recriminations ended the transactions of the year.

The following year the states, after long deliberations at the Hague, published an edict, excluding king Philip from any sovereignty, right, or authority, over the Netherlands. This writing appeared on the 26th of July 1581, under the title of *The Abdication of Philip king of Spain*. It was extremely well drawn up; stated in the strongest manner the mutual privileges of the king and people; proved that the allegiance of the latter was voided by the breach of contract on the side of the former; enumerated the oppressive and tyrannical acts of his government; set aside his authority for the most cogent reasons; forbade money to be coined in his name; and took every other step towards independence. It was in vain for Philip to remonstrate: he knew the states were to be convinced only by the sword; to this therefore he appealed. The duke of Parma blocked up Cambray so closely, that the garrison was reduced to the extremity of living upon horses, dogs, and cats; though they still refused to capitulate, in hopes of being succoured. At length the duke of Anjou assembled a body of 10,000 foot and 4000 horse, and approached Cambray. The viscount de Turenne and count Voulondois undertook to force themselves with a body of men into the town; but they were surrounded and taken prisoners by the Spaniards. This disappointment did not discourage the duke of Anjou; he still pressed forward with intention to attack the Spanish lines; but the duke of Parma, not caring to hazard a battle, deserted his works, and retired to Bouchain. As soon as the duke of Anjou entered the city, he took an oath to govern it agreeable to its ancient laws, and to preserve the citizens in the full possession of all its liberties. He was now pressed by the states and the prince of Orange to march directly into Flanders: he endeavoured to comply; but his army, composed chiefly of volunteers, was so weakened by desertion that the design was laid aside.

It was about this time that the duke of Anjou resumed the notion of addressing Elizabeth queen of England. Not deterred by the ill success of his former negociation, he determined upon a voyage to England; an excursion which proved equally unsuccessful to himself and unfortunate to the United Provinces, as during his absence the duke of Parma made himself master of Tournay, which concluded the transactions of this campaign. He was magnificently entertained, led into a persuasion that all would succeed according to his wish, and at length tired out with tedious expectation. In his absence, St Guilan was reduced by the prince of Espinoy. This general directed his march towards Dunkirk, with intention to join the French forces. The duke of Parma, who had notice of his motion, repaired to seize the opportunity of investing Tournay. He began his approaches, and was vigorously received by that garrison, inspired by the courage of the princess Maria d'Espinoy, niece of the count Horn so cruelly beheaded by the duke d'Alva. The town was stormed in breach by the duke of Parma, who supported the assailants in person, received a wound, and had the mortification to see his Spaniards thrown headlong from the walls. The duke of Anjou

United
Provinces.61
The states
publicly ex-
clude Phi-
lip from
the sove-
reignty.62
Cambray
relieved by
the duke of
Anjou.63
Successes of
the Spani-
ards.

United
Provinces.United
Provinces.

you repeatedly promised succours; but either forgot, or could not perform his engagements: the latter indeed is the most probable; as he was certainly a dupe to the superior policy of Elizabeth, who had not yet declared openly in favour of the States. In the end, despairing of relief, harassed with perpetual watching, and weakened by losses, the garrison capitulated on the 29th of November. The conditions were honourable; and the princeps d'Espinoi was treated with particular marks of distinction by the duke of Parma, who highly esteemed the heroic qualities of this amazon. This advantage was succeeded by another, obtained by the Spanish general Verdugo, over the confederate army in Friesland, commanded by general Norris and William Lewis of Nassau, a young prince of great expectation. It appears from the Spanish account, that Norris was attacked in a defile, where he could not draw out his troops in battalia; and that he was put in confusion, and defeated with great loss. On the other hand, the Dutch writers allege, that he attacked the enemy; but being inferior to them in cavalry, retreated in good order, with scarce any loss.

64
Duke of
Anjou
makes his
public en-
try.

The year 1582 began with a spectacle very unusual in the Netherlands, the public entry of a sovereign elected by the people. The duke of Anjou setting sail from England on the 8th day of February, arrived on the 10th at Flushing, where he was received by the princes of Orange and d'Espinoi. Next day they set out for Antwerp with a magnificent retinue, and went up the Scheld attended by 50 barges. His reception at Antwerp was splendid beyond any thing ever seen in the provinces; they even exceeded the preparations made for Philip himself on his being appointed to the government in the Netherlands by Charles V. his father. A theatre was erected before the walls of the citadel, in which was placed a chair of state, covered with cloth of gold. There the duke was seated, and the conditions were read to him, upon which he was received as duke of Brabant. When he had sworn to observe the articles, he was clothed with the ducal robe, and his head adorned with the ducal coronet by the prince of Orange; who said, "I will pin it in such a manner that it will not be easily shaken:" an expression which at that time was taken for a happy omen, though it soon proved fallacious.

While the states of Brabant were employed in festivity and mirth, a Biscayan merchant, named *Gasper Anasra*, had contrived a project to redeem his shattered fortune by the death of the prince of Orange. He corrupted one of his domestics, by the promise of half the reward, to strike the blow. The assassin entered the citadel; and as the prince was passing after dinner into another room, discharged a pistol, and dangerously wounded him behind the ear. The prince was stunned with the force of the ball, and before he recovered the assassin was killed by his attendants; which prevented for a time the absolute discovery of the plot, though it afterwards appeared from circumstances. It was traced that he had confessed the secret to a Dominican named *Antonio Tunmermon*, receiving from the wicked priest absolution, and a promise of eternal reward. Tunmermon was hanged, drawn, and quartered, his limbs being fixed upon the walls of Antwerp. But though for this time the prince escaped the danger, he was in 1584 assassinated at Delft, by one Balthazar Gerrard or Guion, a person who had before served his highness with fidelity and zeal. He was at that very time employed by the prince to carry letters into France, and had received money to bear his expences, with which he purchased pistols to murder his benefactor. At the criminal's examination, it appeared that he had long meditated this bloody action, and was confirmed in his resolution by the Jesuits and Catholic priests; he even

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Prince of
Orange as-
sinated.

affirmed on the rack, that the duke of Parma was privy to the design, who promised he should have the reward: upon the whole, Gerrard seems to have been an enthusiast, and his crime the result rather of insanity, than of any concerted scheme, or malicious intention. His punishment, however, regarded only the action: it was cruel beyond measure, shocking to humanity, and a striking instance of the vehement party-spirit of the times; not of the justice of the judges, or the attachment of the people to the prince of Orange.

The United Provinces were now in a most deplorable situation. The duke of Anjou had been totally unable to resist the duke of Parma, in consequence of which many towns had been taken; and in other respects the states had sustained immense losses. The duke of Anjou, chagrined and disappointed, had retired to France, where he died. But above all, the loss of the prince of Orange seemed to give the finishing stroke to the affairs of the states; and confusion and anarchy now reigned in their councils. The provinces of Zealand and Holland alone endeavoured to repair the loss, and show their gratitude to William by electing his son Maurice their stadtholder and captain-general by sea and land. Maurice was at that time only 18 years of age; but appeared in every respect worthy of the high dignity which had been conferred upon him. The first step taken by the confederates was a solemn renewal of the treaty of Utrecht; after which the most vigorous preparations were made for the defence of the country. But before any thing of consequence could be done, the duke of Parma had reduced Liskenshouk, Dendermonde, Vilvorde, Ghent, and Antwerp; which struck the states with such terror, that they again offered the sovereignty to queen Elizabeth. This was once more refused; though that princess engaged, by a new treaty, to assist the states both with men and money. An army was accordingly sent into the Netherlands under the command of the earl of Leicester: but it does not appear that this was of any essential service to the cause; for the conduct of that general was so exceedingly improper, that he was not only baffled in every military enterprise, but drew upon himself a general odium. It is very probable indeed that the States could not long have supported themselves in such circumstances, had not Philip rashly engaged in a war with England, with whose naval power he could scarce be enabled to cope by any superiority in numbers whatever. The defeat of the Spanish armada in 1588* * See

66
Prince
Maurice
chosen
stadtholder.67
Success of
the Spaniards.See
England,
n^o 312.68
Duke of
Parma
obliged to
move to-
wards
France.

The remainder of the history of this war is only a detail of the Spanish losses and misfortunes, which now ensued. Their affairs were at last totally ruined by a decisive victory gained by prince Maurice, in the year 1600, over the archduke Albert, who had been appointed the Spanish governor of the Netherlands. King Philip II. died in 1598, leaving the affairs of his kingdom in the most distressed situation; notwithstanding which, his successor Philip III. was too haughty to consent to peace, or allow that the States were free, though he was plainly unable to keep them.

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A truce of
twelve
years con-
cluded
with Spain.

them in subjection. At last, in 1606, the courts of Madrid and Brussels began to think of peace in good earnest. In 1607 a suspension of hostilities took place, and in 1609 a treaty was concluded. In the first article of the treaty, the archduke, in his own and the king of Spain's name, acknowledged the United Provinces, and renounced all claim to sovereignty over them, but in such general terms as would admit of altercation. In the second, a truce for 12 years, by sea and land, through all the dominions of both parties, was concluded. By the third article, the parties were to remain in possession of what they now held, without cession or exchange. In the fourth, a general amnesty was stipulated, and full freedom of trade by sea and land to each others dominions granted. This necessarily implied a cessation of hostilities in the Indies; however, great debates afterwards arose upon this account. Spain observing the rapid progress of the Hollanders in the India trade, apprehended they would soon become too powerful in that quarter; and the Dutch were willing to maintain the advantage of their superiority. Both, for this reason, disputed the article; yet it could not be set aside without destroying the whole treaty, and the fruits of all their laboured conferences. The fifth article regulated the imports, and the duties to be paid by the subjects of the archduke and the States, trading to each others dominions, which were to be on the same footing with those of other nations. The archduke used his utmost endeavours to have the duties at Lillo, on the Scheld, abolished, and the commerce of Antwerp restored to its former grandeur; but this was so diametrically opposite to the interest of the Hollanders, that it was impossible it should ever take place. The sixth and seventh articles likewise regarded commercial affairs. But it would be unnecessary to dwell on particulars. Sufficient is it, that the truce was mutually beneficial, Spain being no longer in condition to support the war, and the Hollanders having obtained the end of all their desperate resistance and invincible perseverance in the cause of liberty. Philip of Nassau, by the truce, entered into possession of all his paternal estates in the Spanish Netherlands and Burgundy; while the States rewarded the faithful services of Maurice with a pension of 25,000 florins, to be paid annually out of the public treasury, besides an appointment of 60,000 francs as governor-general. Pensions were likewise settled on the other princes of the house of Nassau: all were gratified in a manner that demonstrated the high sense the republic had of their merit, though they might possibly be disappointed in their great design of raising prince Maurice to the sovereign authority.

No sooner were the Dutch freed from this extreme danger, and felt the blessings of liberty, than dissensions among themselves took place. The disputes betwixt the Arminians and Calvinists produced violent disturbances, which frequently ended in the persecution of the former. In 1621 war was renewed with Spain; and it may be remarked, that during the whole course of it, the subjects of the republic traded to the Spanish ports, as if there had been an entire friendship subsisting between the two nations. It was no uncommon practice with them to supply towns with provision that were besieged by their own armies; and to furnish the enemy with ammunition and other necessaries, without which they could not carry on the war. Their motive and apology for this conduct was, that thus they kept in their own hands the profits by which other nations would be enriched. By steadily pursuing this line of conduct, making as many prizes as they could by force, and at the same time making as much profit of their enemies as could be obtained by a lucrative trade, it is no wonder that the republic should flourish, and rival in wealth the greatest nations of Europe. In 1628 the Spaniards met with a dread-

ful blow by the capture of their fleet from Mexico. This was the greatest prize the Hollanders had ever met with; being valued at no less than 15,000,000 livres. From this time the Spaniards were everywhere defeated and baffled in almost every enterprize they undertook; nevertheless, they carried on the war, with an obstinacy hardly to be matched, for 20 years longer. At last, in 1648, a treaty was concluded, by which his Catholic Majesty renounced all right and sovereignty over the Lords the States-general of the United Provinces, who were henceforth declared a free and independent republic, and that both sides should remain in the unmolested possession of what they held severally at the signing of the treaty.

From this time to the year 1670 we meet with nothing very remarkable in the history of the United Provinces. By invariably pursuing the maxims of prudence, industry, and frugality, the republic had attained the highest pitch of grandeur. Amsterdam was become the emporium of Europe, and the richest city in the universe. Holland alone contained 3,000,000 of souls, and all the other provinces were proportionably populous. The States dispatched ministers and consuls to China, Siam, and Bengal, to the Great Mogul, the king of Persia, the khan of Tartary, the Grand Signior, the czar of Muscovy, and the princes of Africa. They were considered as an important weight in the scale of Europe, and no treaty was concluded without their ambassadors. The triple alliance with England and Sweden, into which they had entered, gave Louis suspicion that they proposed to set bounds to his ambition, and clip those bold pinions which had so swiftly conveyed his conquests over the Low Countries. Van Beuningen's influence, in comparing himself to Joshua stopping the course of the sun, which was the French king's device, highly disgusted his majesty; who was shocked at the presumption and pride of a republic just started out of obscurity, and gained, in the space of a century, from the ocean. But what was still more alarming to Louis, was the probability that the Dutch would ruin the manufactures of France, and his new established commerce of the Indies. His jealousy discovered itself in divers instances; and the pensioner De Witt, who at that time had the leading of affairs, his brother, and his party, did all in their power to remove these prejudices; but the unhappy differences which then prevailed in the United Provinces frustrated all their endeavours.

Louis now sought every opportunity of breaking with the Dutch; less perhaps from any dread of their power, or ability to injure him, than with a view to enlarge his dominions by the entire conquest of the Low Countries. He knew that the whole strength of the republic consisted in her marine; that her frontier was weak, her provinces divided, and the chief power in the hands of men inveterately set against the family of Orange, the ancient captains of the republic. His first attempt was to dissolve the triple alliance, and disengage from it Charles II. king of England. In this business the duchess of Orleans was employed: she went to England under pretence of visiting the king her brother; and her negotiation was successful. In the mean time Louis possessed himself of Lorraine, under pretence that duke Charles was forming alliances in the empire against France.

The following year was spent in negotiations with the emperor, Spain, and Sweden, with the electors of Cologne and Brandenburg, with the bishop of Munster, and other spiritual and German princes. The design of Louis was to prevent their acceding to the triple alliance; from which he had already weaned one power, the most considerable of the whole. The bishop of Munster beheld with uneasiness

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71

Spanish fleet taken.

72

Peace concluded.

73

Flourishing state of the republic.

74

Cause of the war with France.

75

Treaty between the kings of France and England.

70

War renewed.

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Provinces.

the growing power of the United Provinces: he pretended that they had made several attempts upon the counties of Stirum, Culemborg, Bentheim, and East Friesland; that they had seized on Ravenstein on the Meuse, and several other places belonging to his bishopric. In his own defence he concluded a treaty with France, and prevailed on the elector of Cologne to follow his example. By signing a treaty with these two princes, the king opened a way to Holland by the Meuse and the Rhine; he established by this means places of arms and magazines in a country distant from his own dominions, and secured a retreat in case his enterprise proved abortive. With respect to the emperor, every artifice was used to keep him neutral; and indeed his own inclinations co-operated but little in favour of the Dutch, whom he regarded as subjects revolted from the princes of his family, and in possession of several places belonging to the empire. In Sweden, Louis's negotiations were equally successful; for here he prevailed so far with Charles XI. as to obtain a stipulation, that if the emperor, or any of the princes of the empire, joined their forces to the Dutch, a Swedish army should march into the very heart of Germany and join the French, in order to force those princes to observe the treaty of Westphalia.

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Branden-
burg assists
the repub-
lic.

Of all the Germanic body, the elector of Brandenburg alone interested himself for the safety of the States-general. The peace of Westphalia had prevented this enterprising prince from extending his dominions in Germany, and retaking Pomerania from the Swedes. He had long aspired at the stadtholdership of Holland; and though that office had been for six years suppressed, yet he flattered himself, that in case of a war he might obtain it, perpetuate it in his family, and in time reduce Holland by dint of force, intrigue, and stratagem. With this view, he rejected the proposals of several princes of the empire, and even those of France, endeavouring by every possible method to insinuate himself into the friendship and confidence of the States. In the end he concluded a treaty with them, whereby it was stipulated that he should assist the republic with 25,000 men. Beverning, the Dutch ambassador at Madrid, disconcerted all the schemes of France at that court, and engaged the queen of Spain to furnish money and troops for the defence of the United Provinces. Thus was the face of Europe wholly changed. France and England, who had contributed largely to the raising and aggrandizing the republic, were now incited to destroy her; while Spain, which for an age had been endeavouring to suppress her, was arming for her support. Pierre de Groot, the Dutch minister at the Hague, was employed to penetrate into Louis's designs; he gave his constituents notice that he foresaw a terrible storm ready to fall upon them, which they might nevertheless break by seasonable submissions and proper acknowledgments. Upon this the States wrote to the king, endeavouring to appease his wrath; but finding him inexorable, they prepared for receiving him, and provided for the security of their provinces. But the long peace the republic had enjoyed destroyed her standing forces, and little confidence could be reposed in her new levied soldiers.

77
Hostilities
commen-
ced.

As soon as matters were ripe for execution, Louis ordered an army of 100,000 men to file off towards the Rhine. Before the opening of the campaign, and previous to his declaration of war, he divided his army into four columns; commanding one in person, with the marshal Turenne under him. Another was led by the prince of Conde, assisted by the marshals Humieres and Bellefonds; the third was headed by Crequi; and the fourth marched to Westphalia under the conduct of the duke of Luxemburg, to join the bishop of Munster. As the marshals Crequi, Bellefonds, and Humieres, refused to receive orders from Turenne, they were

banished; but after six months exile, were recalled, at the instance of the whole body of marshals in France, upon their making proper submissions.

Such an army drawing towards their frontiers could not but terrify the Dutch, now torn with civil factions. The partisans of the Orange family were for abolishing the perpetual edict, and raising William III. to the dignity enjoyed by his predecessors; but the De Witt faction opposed him violently, though they could not prevent the young prince from being chosen captain-general and high admiral. Many persons hoped that William's new dignity would incline his uncle Charles II. to return to the triple alliance; but that hope was frustrated by the conduct of his majesty; who, in conjunction with the most Christian king, declared war against the States-general on the 7th day of April. A month after, the elector of Cologne and bishop of Munster followed the example of the two kings. The Dutch put themselves in the best posture of defence that circumstances would admit. Maastricht was strongly garrisoned; the prince of Orange had assembled an army of 25,000 men, with which he advanced to the banks of the Issel, and the Dutch fleet cruised off the mouth of the Thames to prevent the junction of the naval forces of England and France, which amounted to 150 ships. All Europe watched the first motions of two powerful kings, seconded by the best generals of the age.

His most Christian majesty joined his army at Charleroy. It was composed of 23 companies of *gens d'armes*, life-guards, musqueteers, and light-horse, two regiments of the French and Swiss guards, 14 regiments of foreign infantry, and 60 regiments of light horse or dragoons, comprising in all an army of 110,000 fighting men, under the command of marshal Turenne as captain-general. Holland could only be attacked by the Rhine or the Meuse; and the generals and ministers differed by which of these inlets they were to make the first impressions. At last, after several deliberations, it was determined to make both attacks at the same time, in order the more to disconcert their councils. It is probable that Turenne always opposed the siege of Maastricht; for we find him immediately after the surrender of Maseik strongly dissuading the king from that enterprise, in opposition to the sentiments of the prince of Conde. At last he prevailed; and it was resolved in council to advance towards the Rhine, and besiege at the same time the towns of Rhinberg, Vessel, Orsoi, and Burick. These places were all well fortified, and deemed the keys of Holland; however, the Dutch did not appear disturbed at their being invested, as they were only under the protection, and did not immediately belong to, the United Provinces. They were besides in hopes that any attempts upon the territory of Cleves would hasten the preparations of the elector of Brandenburg, and even rouse the emperor into a sense of the danger he was in from the vast designs of Louis. Nothing could oppose armies so well appointed, led by generals so skilful and so experienced. The four towns surrendered within a few days of each other; and Rhinberg, that held out longest, opened its gates on the seventh of June. A few days after, the town and fort of Rhees, and the town of Emerick, surrendered; upon which the king resolved to pass the Rhine by a ford, over which the cavalry were to swim. This bold enterprise was projected and conducted by Conde; who, in the face of two regiments of foot, and several squadrons of horse, under general Wartz, intrenched on the opposite side, effected the passage, in the same order, and with as much regularity, as if he had marched his troops on dry land. The enemy made a stout resistance; but were driven from their post, after having killed the duke de Longueville on the spot, and wounded the

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Successes of
the French.

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the prince of Conde, which disabled him for some time from attending the service, and obliged him to resign the command of his army to Turenne.

It is almost incredible with what rapidity towns and fortresses yielded to the fortune of his majesty's arms. The reduction of Betau, the most fruitful country of the United Provinces, and the surrender of Tolhus fort, obliged the prince of Orange to abandon the Iffel, lest he should be attacked in the rear, and to retire to the very heart of the country, as far as Rhenen, in the province of Utrecht. By this means the town of Arnheim, the forts of Knotsemborough, Voorn, St André, and Shenok, this last, the strongest in the Netherlands (having cost the great Henry Frederic prince of Orange a seven months siege), with a variety of other forts and towns, surrendered as soon as summoned; and at last Nimeguen, a town strong from the nature of the works and fortifications, and garrisoned by 8000 fighting men, including the inhabitants, was invested. After the citizens had for eight days exhibited signal proofs of courage in defence of their liberties, they were forced to yield to the superior skill of Turenne.

In the mean time the bishop of Munster and elector of Cologne, having joined that body of troops under the command of the duke of Luxemburgh, the united army entered the province of Overysse, and by dint of cruelty, and terror which the duke spread, reduced the towns as soon as he appeared before them. Animated by that implacable rage that constantly attends religious wars, the two prelates obliged the duke to exert a severity, by no means suited to his nature, against heretics and the rebellious subjects of the house of Austria. Next the king's forces penetrated into the province of Utrecht, where their conquests went on with the same rapidity, and put the capital of the province in the utmost danger. To retard its fate, the Dutch could imagine no other expedient than opening their sluices, and overflowing the country. The other towns followed the example of Utrecht; and Holland, Brabant, and Dutch Flanders, was one vast lake, the towns rising like islands in the midst of the waters. Farther to stem the torrent of Louis's conquests, the people were persuaded the only barrier was to lodge the supreme power in the hands of the prince of Orange. They accordingly obliged the states of Holland and West Friesland to unite the dignity of stadtholder to those of captain-general and high-admiral, with which the prince was already invested. They likewise sent remonstrances so pathetic to the king of England, that Charles, moved with the situation of the republic, and jealous of the designs of Louis, dispatched the duke of Buckingham and earl of Arlington into Holland, to quiet the fears of the Dutch, and insist upon the king's penetrating no farther into Holland. In case of Louis's refusal, Charles declared he would break the alliance; as he perceived that, instead of securing Zealand to the English, agreeable to the treaty, the designs of France were to unite the whole republic to their own monarchy. His most Christian majesty had in fact no great regard to the menaces of his ally; but as persisting obstinately to advance into a country which the inundation rendered impassable, might terminate in the ruin of all his schemes, he seemed, out of compliment to the king of England, to listen to terms of accommodation; which, after all his victories, could not fail of proving advantageous. In the space of three months he had conquered the provinces of Guelderland, Overysse, and Utrecht, taken about 50 towns and forts, and made 24,000 prisoners. Conde and Turenne advised his majesty to send the prisoners to work upon the canal of Languedoc, and to leave all the places that were not essential to the preservation of his conquests; the minister Louvois was of a different opi-

nion, and his sentiments determined the king. The prisoners were released for a trifling ransom, and the king's army totally reduced and exhausted by the continual drains made to garrison the conquered places.

A negociation was set on foot at Boxtel, near Bois-le-duc, whither the king, attended by the English ambassadors and the Dutch deputies, repaired: but the terms required of the republic were so hard, that they were rejected with disdain by the Dutch; who, animated by their stadtholder, resolved to wait a change of fortune in the midst of the waters. They used every expedient to rouse the princes of Germany in their defence; and so successfully, that the elector of Brandenburg, the nearest and most interested prince, prepared to take the field. The undaunted courage, the vigilance, the public spirit of the prince of Orange, gained him the entire confidence and affection of the republic; and excited their resentment against the two brothers De Witts, his implacable enemies, whom they accused of receiving pensions from Louis. The suggestion was false; but possibly their love of liberty, and jealousy of the house of Orange, had carried those two great politicians too far in their pacific measures and complaisance to the power of the French monarch. The pensionary was attacked in the street by the populace; but by his personal bravery broke through the crowd, and saved his life, though covered with wounds. Soon after the sedition broke out afresh, and the partisans of the house of Orange again stirred up the animosity of the republic against the De Witts. Several crimes were laid to the pensioner's charge, but he cleared himself. Suborned witnesses accused his brother of an attempt to poison the prince of Orange. Cornelius was imprisoned and treated with great barbarity. While he was under the torture, he sung that ode of Horace, *Iustum et tenacem propositum virum*. His brother took him out of prison after sentence of banishment was pronounced; the tumult rose high, and both the De Witts were cruelly torn in pieces in the streets. William of Orange seemed touched at this terrible sacrifice; he made the pensionary's eulogium, and ordered the murderers to be prosecuted; however, the clemency he showed them, the advantages he obtained by the massacre, and the animosity he bore the De Witts, convinced all men that he countenanced the murder.

William of Orange, in the mean time, daily ingratiated himself more. He gave up his whole fortune for the safety of the state; and exerted himself with such prudence and ability, that all Europe began to unite against the two kings by the month of July. Every prince in Germany was in motion to succour the Dutch. The emperor, the king of Denmark, the elector of Brandenburg, the duke of Brunswick Lunenburg, the landgrave of Hesse, immediately ordered their troops to join; several of the other princes were preparing to take the field. All were jealous, England began to waver, and there was not a power in Europe upon whom Louis XIV. could heartily rely. The army of Brandenburg, commanded by the elector in person, and the forces of the empire under the famous Montecuculi, joined near Heidelberg, and composed a body of 40,000 men. Turenne, now appointed generalissimo of the king's army on his majesty's return to Paris, marched to oppose the enemy's passing the Rhine. For three whole months were the elector and Montecuculi employed in abortive attempts to effect a passage at Mentz, Coblenz, Strasburgh, and other places. This answered the purpose of making a powerful diversion in favour of the Dutch, though they could not accomplish their design of joining the prince of Orange. After repeated disappointments, the Imperial army directed its march to Westphalia; and Turenne followed, in order to keep the bishop of Munster steady to his engagements. For half the campaign,

79
The Dutch
obliged to
overflow
their coun-
try.

80
Unsuccess-
ful negoti-
ation.

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The De
Witts
cruelly
murdered.

82
Exploits of
Turenne.

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Provinces.

paign, he, with a body of 16,000 men, baffled every stratagem of the elector and Montecuculi, the latter the most renowned general of the empire, at the head of an army near triple his strength. He obliged them to go into winter-quarters, in a country harassed and exhausted; and confirmed the bishop of Munster in the alliance of France, at the very time he was on terms with the emperor. He obliged the elector of Brandenburg, who took the chief command during Montecuculi's illness, to abandon the siege of Werle; took Unna, Kamen, Altena, Berkembam, and several other towns and fortresses. By continuing his operations, he forced the elector out of his winter-quarters again into the field, chased him from post to post, until he obliged him to quit Westphalia, repass the Weser, and retire with precipitation into the bishopric of Hildesheim. After taking possession of the elector's towns in Westphalia, he pursued him into the bishopric of Hildesheim; and at length, by mere dint of superior genius, forced him to seek shelter in his hereditary dominions. All this was effected after Louvois had appointed the marshal's army quarters in Alsace and Lorraine, amidst the rigours of a severe winter, opposed by a superior enemy, by the artifices of Louvois, and seconded only by his own prudence, and the affections of his troops, which he maintained in defiance all the difficulties, hardships, and dangers, they encountered. It was indeed supposed, that Montecuculi was prevented from giving Turenne battle by the remonstrances of prince Lobkowitz, the emperor's ambassador, influenced by the gold of Louis. Certain indeed it is, that Montecuculi's illness arose from his chagrin at seeing all his projects frustrated by the unsteady dilatory conduct of the court of Vienna. Louis's negotiations disturbed Europe no less than his arms. His tools and creatures swarmed in every court. Leopold could not be prevented from declaring in favour of Holland; but his ministers were bought off from seconding the emperor's intentions. The whole English nation exclaimed against the alliance of their king with France; but Charles stood in need of French gold to supply his extravagance and profligacy. The elector of Bavaria had indeed been compelled by Louis to retire to his capital; but it was by dint of intrigue that he was forced from his alliance with Holland, and constrained to sign a peace with France.

While Turenne was thus employed on the Rhine, Conde having recovered of his wounds, returned to the command of the army in Holland. He besieged and took Maastricht in 13 days. Having repaired the fortifications, he proposed making himself master of several other towns; but the inundations everywhere stopped his course. All his attempts to draw off the waters were in vain; and he was forced to content himself with preserving, without pretending to extend, the king's conquests.

Whatever glory the king might have acquired by land, certain it is that the conduct of his admirals deserved equal praise with that of his generals. In little more than 12 months the French were taught the art of naval war. Before, they fought ship to ship; but understood nothing of those evolutions by which whole fleets imitate the movements of armies. The duke of York, afterwards James II. invented the method of giving all orders at sea by means of signals: this and every other part of the art the French borrowed from the English; and became so apt scholars, that they ventured to give battle to the Hollanders, the great rivals of the English on that element. Their fleet, amounting to 40 sail, besides fire-ships, joined to the English, gave battle three different times to the Dutch. De Ruyter gained additional glory in these engagements; and D'Estrees the French admiral gained the esteem of De Ruyter.

In the mean time, Spain declares in favour of the Dutch;
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and prevails upon the emperor to act more heartily in the cause of Holland, and defence of the liberties of Europe. The prince of Orange was reinforced by 10,000 Spaniards, sent to him by the governor of the Low Countries. Philip had concluded a treaty with the States at the Hague, whereby he declared war against France, engaged the emperor to make a powerful diversion on the Rhine, stipulated not to accept of peace before the Dutch had retrieved all their losses, and obtained from them a promise to listen to no terms of accommodation before his Catholic majesty was reinstated in all his possessions in the Low Countries, previous to the peace of the Pyrenees. Montecuculi was ordered to advance with 30,000 men to Franconia; and Turenne, joining the troops of Cologne and Munster, passed the Main, and took post in the electorate of Mentz. The prince of Orange receiving no impediment from Conde, who was forced on account of the inundations to repass the Meuse, thought this a proper time for action, as the enemy had no considerable forces in the heart of the United Provinces. He ordered some troops to file off secretly to Amsterdam and Mnyden; lined with infantry the intrenchments which secured the passage to Holland; and to deceive the duke of Luxemburg, who commanded in Utrecht, sent some forces by sea to attack Bommel. The duke, not penetrating the prince's design, came to succour the place; and William, finding his stratagem succeed, marched to Naerden, and with 25,000 men invested and took the place before the duke could provide for its security. Upon this success, the Dutch took courage, fortune inclined in their favour, and in a short time all the horrors of war were removed from the interior parts of the United Provinces to the Spanish Netherlands. Neither the experience nor consummate address of Turenne, the genius of Vauban, or the indefatigable vigilance of Louvois, could repair the error committed in ruining the army to garrison the conquered towns. Even Conde's fire seemed extinguished in the waters with which the Dutch had drowned their country. Instead of penetrating farther, he was obliged to retreat. Turenne could not prevent the junction of Montecuculi and the prince of Orange, nor the loss of Bonne. This junction, and the declaration of Spain, obliged the armies of France to abandon the three provinces with still more rapidity than they had conquered them. The triumphal arch at St Dennis was hardly erected as a monument of Louis's victories, before the fruits of those victories were relinquished. In a word, the parliament of England would no longer suffer Charles to be the mercenary tool of France; the late ill success cooled the elector of Cologne and the bishop of Munster in their friendship; and Louis, forsaken by all his allies, found himself under the necessity of maintaining singly a war against the empire, Spain, and the United Provinces.

From that time the United Provinces have been distinguished among the European nations as a very considerable maritime and commercial power. Their connection with Britain by the Revolution in 1688, when William III. stadtholder of Holland became king of this island, brought on a much closer connection between the two nations than had ever taken place before. By means of this connection, William formed a plan of humbling his great adversary Louis XIV. who had so lately brought his country to the verge of ruin. For this purpose he renewed the war in 1689, and commanded the army in person. However, he was overmatched by the abilities of Luxemburg the French general; who opposed him, and obliged him to conclude a peace in 1697. His enmity to the French king, however, was not yet extinguished. The remaining part of his life he employed in forming the most powerful confederacy against

United
Provinces.83
Fortune
declares a-
gainst the
French.84
State of the
republic to
the present
time.

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Province.
* See Bri-
tain, n^o 339,
340.

against that monarch; and so much was he wrapped in this project, that even in his dying moments it seemed to prevail over every other consideration*. His measures, however, were adopted by his successor Queen Anne; and the French monarchy had nearly sunk under the united efforts of the forces of Britain, Holland, and Germany, headed by the experienced generals Marlborough and Eugene. But at last the whole plan was disconcerted by a revolution in the British ministry; the Dutch were disappointed in the moment of their expectations, and obliged to consent to the peace of Utrecht, which left them exposed to the attempts of France as much as ever. A barrier composed of a great number of fortified towns was indeed granted them; but barriers of this kind are a slender defence against the modern improvements in war. In the war of 1739, these towns were taken one after another by Marshal Saxe, who thus revenged the exploits of the duke of Marlborough; while the Dutch and British army, commanded by the late duke of Cumberland, were driven from place to place, without being able to make one successful effort from the beginning of the war to the end of it. See BRITAIN, n^o 342—429.

It is probable that the bad success of this war cooled the affections of the Dutch towards Britain so much, that ever since they have acted rather as concealed enemies than friends. In the war of 1755, their attachment to France was evident; and in the last, it proceeded to such an height, as to oblige the British ministry to declare war against them. The issue of this war is still fresh in our memories. A single naval engagement was the only event of consequence that took place, and showed that both were formidable antagonists to each other.

This war was undertaken in opposition to the wishes of the stadtholder, who having been maintained in his prerogatives chiefly by the powerful influence of Britain and Prussia, could have no motive for making a rupture with the court of London. The subsequent transactions of the States-general have been related under other articles (see PRUSSIA and REVOLUTION). Having deserted the grand alliance formed against the disturbers of the peace of Europe, and the office of the stadtholder being abolished, the Dutch republic, under the name of an ally, is now in reality little better than a province, of France. The consequence of this alliance is what might have been expected. The British government, obliged to attack its enemies wherever it might find them, commenced hostilities against the United Provinces, and in the compass of a very short period wrested from them their most valuable possessions both in the eastern and in the western world.

85
Climate,
&c. of the
United
Provinces.

The seven United Provinces being in great part surrounded by the sea, lying low, and abounding in marshes, have a damp and unwholesome air. Rains and fogs are frequent; and the gout, scurvy, rheumatism, and agues, very common and difficult of cure. The effects of human industry here are wonderful in the dykes and dams erected for defending the country against the inundations of the sea, and in ditches, canals, mills, and sluices, for draining the marshes. The quantity of grain produced is not sufficient for home consumption; but the pastures in the marshes are so rich, that they can spare a great deal of butter and cheese for exportation. They have also a good breed of sheep, whose wool is highly valued. There is turf, madder, tobacco, some fruit, and iron; but all the pit-coal and timber used in this country, and indeed most of the necessaries of life, are imported. All the provinces either lie upon, or communicate with, the North Sea, by means of that called the *Zuyder*, or *South Sea*; which was formed partly by the Rhine's right branch, then increased by the Vecht, which has now another outlet, overflowing the low swampy grounds thro'

which it passed; and partly by the sea, in the 13th century, breaking in, and overflowing a large tract of ground contiguous to that before laid under water by the Rhine. The principal rivers are the Rhine, the Meuse, the Scheld, and the Vecht. The first is divided into several branches, one of which joins the Old Iffel, and after that falls into the Zuyder Sea; another named the *Leck*, at the village of Krimpen, mingles with the Meuse; a third, called the *Crooked Rhine*, is branched out at Leyden into canals, of which one runs into the lake of Haerlem, and another loses itself in the sand hills between Catwyk on the Rhine, and Catwyk on the sea; and a fourth, called the *Waal*, falls into the Meuse over-against Workum. The Meuse, after dividing itself into two branches, and again uniting these, falls into the North Sea below Rotterdam. The Scheld below Antwerp divides itself into two branches, called the *Western* and *Eastern Scheld*; the first separating Flanders from Zealand; and the other, running north by Bergen-op-Zoom, and afterwards east, between the islands of Beveland and Schowen, falls into the sea a little below. The Vecht runs from east to west through the province of Overijssel, and falls into the Zuyder Sea. There are many smaller rivers that join these, and a vast number of canals; yet there are few good harbours in the provinces. The best are those of Rotterdam, Helvoetsluys, and Flushing. As to the harbour of Amsterdam, it is indeed one of the largest and safest in Europe; but there is a bar at the entrance of it, over which large vessels cannot pass without being lightened or unloaded. There are no mountains in these provinces; and the only lake, properly so called, is that of Haerlem. The provinces are extremely well cultivated, and very populous; especially that of Holland, which, in this respect, perhaps has not its equal in the universe. The towns are very agreeable, being kept clean, and having canals in the middle of the streets, planted with trees. The number of inhabitants is computed at about 2,000,000. The animals here are much the same as in England; but their horses and horned cattle are of a larger size. Storks build and hatch on their chimneys; but, being birds of passage, they leave the country about the middle of August, with their young, and return the February following. It is said there are some wild boars and wolves here; and that neither oysters nor herrings are to be found upon the coast: but of other fish they have the several sorts, both in their seas and rivers, that we have in Britain.

86
The established religion here before the Revolution was the Presbyterian, or Calvinism: none but Presbyterians were admitted into any office or post in the government, excepting the army; all religions and sects, however, were tolerated, and had their respective meetings or assemblies for public worship, among which the Papists and Jews were very numerous. Since the late alliance with France, no particular religion is established; and the phlegmatic Dutch have drunk deep of the cup of infidelity, mixed by their new and volatile allies.

There are five universities in the provinces, viz. those of Utrecht, Leyden, Franeker, Groningen, and Harderwic; but the three last are inconsiderable. The dissenters in England often send their children to these universities for education. Before the Reformation there was an archbishop at Utrecht, who had for his suffragans the bishops of Deventer, Groningen, Middleburg, Haerlem, and Lewarden. The language here is a dialect of the German, but French is much spoken by the better sort.

87
With regard to the commerce of this country, their East India company had the monopoly of the fine spices for more than 100 years, and was long the most opulent and powerful of any in the world. Though the country itself produce

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Commerce,
&c.

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duces very few things, yet almost all the products and commodities of the globe may be found here, nearly as cheap as in the countries where they are made or produced. A vast variety of manufactures are carried on in the provinces, and with extraordinary skill and diligence; and a great number of hands are employed, and much wealth acquired, by the herring, cod, and whale fisheries. No nation has hitherto equalled them in the curing of herrings; those cured at Glasgow, in Scotland, are thought to come nearest to them. About 150 sail were annually employed in the whale-fishery, and about 200 in the herring. The profits of the latter, in a good year, after all deductions, were thought to amount to 200,000 Holland guilders. The principal manufactures here are those of linen, paper, and earthen ware of all sorts. Ship-building also employs vast numbers of hands. The trade of this country, however, upon the whole, has long been declining; owing partly to a decline of their ancient parsimony and industry; but chiefly to the improvement of manufactures, trade, and navigation, in other countries; and at present (1796) it is almost annihilated.

88
Constitu-
tion.

The late constitution was somewhat singular. Most of the towns in the several provinces are little republics, whose deputies, with the nobility, composed the states thereof; and the deputies of the provinces, in like manner, composed the States-general. Every town or province might send as many deputies as they pleased to the assemblies of the provincial states, or States-general; but those of each town or province had but one voice, and presided by turns. No resolution taken by the States-general was of any force till confirmed by the several provinces. The legislative power in the towns was vested in the senates; and the executive in the burgomasters, syndics, &c. The states of the provinces were styled, Noble and Mighty Lords; but those of Holland, Noble and Most Mighty Lords; and the States-general, High and Mighty Lords, or the Lords the States-general of the United Netherlands, or their High Mightinesses. Besides the States-general, there was also a council of state, consisting of deputies from the several provinces, making twelve in all; of which Holland sent three; Guelderland, Zealand, and Utrecht, two a-piece; and Friesland, Groningen, and Overijssel, one. In this council every deputy presided a week by turns, and the stadtholder had a decisive voice when the votes happened to be equal. The principal affairs that came under their deliberation, were those relating to the army and finances. The stadtholder was also president of the states in every province, but had no seat in the States-general. One dissenting voice in the provincial states prevented their coming to any resolution. See *STADTHOLDER*.

Such was the constitution of the seven United Provinces. They are now employed in framing for themselves a new one, upon the plan dictated to them by their masters the French.

With respect to the administration of justice in this country, every province has its tribunal, to which, except in criminal cases, appeals lie from the petty and country courts; and it is said, that justice is nowhere distributed with more impartiality.

89
Taxes.

The taxes in these provinces are so many, and so heavy, especially in Holland, that it is not without reason asserted, that the only thing that has escaped taxation there is the air they breathe. The ordinary revenues of the republic are computed at between two and three millions Sterling annually. Out of 100 guilders, the province of Holland contributes 38; and consequently above one half of the whole public expences. For the encouragement of trade, the duties on goods and merchandise are said to be exceeding low.

With respect to their land-forces in time of peace, they seldom exceed 40,000, and very often fall short of that number. They employ a great many foreigners in their service; and in time of war hire whole regiments of Germans. Their navy, were they to enter heartily into any war, could soon be made formidable, as they have always vast quantities of timber prepared for building ships, and great numbers of ship carpenters and mariners. It is under the direction of the five admiralty colleges, who, to defray the charges thereof, levy the duties on exports and imports.

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Provinces
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University.
90
Forces by
sea and
land.

As to the character of the Dutch, the boors or husbandmen are industrious enough, but heavy, and slow of understanding. The seamen are a plain, blunt, but rough, surly, and ill-mannered sort of people. Their tradesmen are something sharper, and make use of all their skill to take advantage of those they deal with. Every class of men is extremely frugal. All appetites and passions run lower and cooler here than in other countries, avarice excepted. Quarrels are very rare; revenge is seldom heard of; and jealousy scarcely ever known. It is very uncommon for any of them to be really in love, or even to pretend to it; nor do the women seem to care whether they are or not. People converse pretty much upon a level here; nor is it easy to distinguish the man from the master, or the maid from the mistress, such liberties do they allow their servants, or rather are obliged to allow them; for they may not be struck or corrected by them, but the dispute must be left to the magistrate. The Dutch are tall and strong built; but both men and women have the grossest shapes that are to be met with anywhere. Their garb, except among the officers of the army and some few others, is exceeding plain, and the fashions change as seldom as in Spain. The men are addicted to drinking, which some think necessary in this foggy air, both for their health and the improvement of their understandings. Among their diversions, that of skating in winter is one of the chief. It is amazing to see the crowds in a hard frost upon the ice, and their great dexterity in skating; both men and women darting along with inconceivable velocity. The Dutch are remarkable for their cleanliness; nothing can exceed the neatness of their houses, towns, and villages. Many of them have distinguished themselves by their learning, and some even by their wit and ingenuity; witness Erasmus, Grotius, &c. The Dutch excel also in painting and engraving; and some of them have been no contemptible statuarys.

91
Character.

UNITY, in poetry. There are three unities to be observed, viz. the unity of action, that of time, and that of place. In the epic poem, the great, and almost the only, unity, is that of the action. Some regard indeed ought to be had to that of time; for that of place there is no room. The unity of character is not reckoned among the unities. See *POETRY*, Part II. Sect. 3.

UNIVERSAL, something that is common to many things; or it is one thing belonging to many or all things.

UNIVERSE, a collective name, signifying the whole world; or the assemblage of heaven and earth, with all things therein. See *ASTRONOMY* and *GEOGRAPHY*.

UNIVERSITY, is the name of a corporation formed for the education of youth in the liberal arts and sciences, and authorized to admit such as have studied in it, to certain degrees in different faculties, which not only served as certificates of proficiency in science, but also confer on those who obtain them considerable privileges within the university, as well as some rank in the state without it. Universities generally comprehend within them one or more colleges: but this is not always the case; for the university of St Andrew's was in being before either of its colleges was founded, and it would continue in being with all its

University. privileges though both its colleges were levelled with the dust.

In every university with which we are acquainted, there are four faculties, viz. *Theology, Law, Physic, and the Arts and Sciences*, comprehending mathematics, natural and moral philosophy, &c.; and in Oxford, Cambridge, and some other universities, *Music* is considered as a fifth faculty. In each of these there are two degrees, those of *Bachelor* and *Doctor*; for though in the universities of Great Britain and Ireland we have no such degree as *Doctor in Arts and Sciences*, our *Master of Arts* answers to the degree of *Doctor in Philosophy*, which is conferred by many of the universities on the continent.

Universities in their present form, and with their present privileges, are institutions comparatively modern. They sprang from the convents of regular clergy, or from the chapters of cathedrals in the church of Rome, where young men were educated for holy orders, in that dark period when the clergy possessed all the little erudition which was left in Europe. These convents were seminaries of learning probably from their first institution; and we know with certainty, that in Old Aberdeen there was a monastery in which youth were instructed in *theology*, the *canon law*, and the *school philosophy*, at least 200 years before the university and King's College were founded. The same was doubtless the case in Oxford and Cambridge, and probably in every town in Europe where there is now a university, which has any claim to be called ancient; for it was not till the more eminent of the laity began to see the importance of literature and science, that universities distinct from convents were founded, with the privilege of admitting to degrees, which conferred some rank in civil society. These universities have long been considered as lay corporations; but as a proof that they had the ecclesiastical origin which we have assigned to them, it will be sufficient to observe, that the Pope arrogated to himself the right of vesting them with all their privileges; and that, prior to the Reformation, every university in Europe conferred its degrees in all the faculties by authority derived from a papal bull.

It is perhaps no improbable conjecture, that the church of Rome derived her idea of academical honours from the Jews, among whom literary distinctions extremely similar subsisted before the nativity of our Saviour. Among them, the young student, with respect to his learning, was called a *disciple*; from his minority a *junior*; and the *chosen* or *elected*, on account of his election into the number of disciples. When he had made some progress in knowledge, and was deemed worthy of a degree, he was by imposition of hands made *חבר*, a companion to a *Rabbi*, the person who officiates using this form, *I associate thee*, or, *Be thou associated*; and as soon afterwards as he was thought worthy to teach others, the *associate* was raised to the rank of *Rabbi*. Whether this process suggested the idea or not, it has certainly some resemblance to that by which a young man in our universities passes through the degree of *Bachelor* to that of *Master of Arts* or *Doctor*.

The most ancient universities in Europe are those of OXFORD, CAMBRIDGE, PARIS, SALAMANCA, and BOLOGNA; and in the two English universities, the first founded colleges are those of *University, Baliol, and Merton*, in the former, and *St Peter's* in the latter. Oxford and Cambridge, however, were universities, or, as they were then called, *studies*, some hundreds of years before colleges or schools were built in them; for the former flourished as a seminary of learning in the reign of Alfred the Great, and the other, could we believe its partial partizans, at a period still earlier. The universities of Scotland are four, ST ANDREW'S, GLAS-

GOW, ABERDEEN, and EDINBURGH. In Ireland there is but one university, viz. that of DUBLIN, founded by Queen Elizabeth, and very richly endowed.

An idle controversy has been agitated, whether the constitution of the English or of the Scotch universities be best adapted to answer the ends of their institution; and, as might be expected, it has been differently decided, according to the partialities of those who have written on the subject. Were we to hazard our own opinion, we should say, that each has its advantages and disadvantages; and that while the English universities, aided by their great schools, to which we have nothing that can be compared, are unquestionably fitted to carry their young members farthest in the knowledge of the learned languages, the mode of teaching in our own universities is better adapted to the promotion of arts and sciences, and the communication of that knowledge which is of most importance in active life.

UNIVERSITY-COURTS, in England. The two universities enjoy the sole jurisdiction, in exclusion of the king's courts, over all civil actions and suits whatsoever, where a scholar or privileged person is one of the parties; excepting in such cases where the right of freehold is concerned. And then by the university charter they are at liberty to try and determine, either according to the common law of the land, or according to their own local customs, at their discretion; which has generally led them to carry on their process in a course much conformed to the civil law.

This privilege, so far as it relates to civil causes, is exercised at Oxford in the chancellor's court; the judge of which is the vice-chancellor, his deputy, or assessor. From his sentence an appeal lies to delegates appointed by the congregation; from thence to other delegates of the house of convocation; and if they all three concur in the same sentence, it is final, at least by the statutes of the university, according to the rule of the civil law. But if there be any discordance or variation in any of the three sentences, an appeal lies in the last resort to judges delegates appointed by the crown, under the great seal in chancery.

As to the jurisdiction of the university courts in criminal matters, the chancellor's court at Oxford, and probably also that of Cambridge, hath authority to try all offences or misdemeanors under the degree of treason, felony, or mayhem; and the trial of treason, felony, and mayhem, by a particular charter, is committed to the university jurisdiction in another court, namely, the court of the lord high steward of the university.

The process of the trial is this. The high steward issues one precept to the sheriff of the county, who thereupon returns a panel of 18 freeholders; and another precept to the bedells of the university, who thereupon return a panel of 18 matriculated laymen, *laicos privilegio universitatis gaudentes*: and by a jury formed *de medietate*, half of freeholders and half matriculated persons, is the indictment to be tried; and that in the guildhall of the city of Oxford. And if execution be necessary to be awarded in consequence of finding the party guilty, the sheriff of the county must execute the university process; to which he is annually bound by an oath.

VOCABULARY, in grammar, denotes the collection of the words of a language, with their significations, otherwise called a *dictionary*, *lexicon*, or *nomenclature*. See DICTIONARY.

A vocabulary is properly a smaller kind of dictionary, which does not enter so minutely into the origin and different acceptations of words.

VOCAL, something that relates to the voice or speech; thus vocal music is that set to words, especially verses, and

University
Vocal.

Vocative to be performed by the voice; in contradistinction to instrumental music, composed only for instruments, without singing.

Volatile.

VOCATIVE, in grammar, the fifth state or case of nouns. See GRAMMAR.

VOETIUS (Gisbert), an eminent divine of the 16th century, was professor of divinity and the Oriental tongues at Utrecht, where he was also minister. He assisted at the synod of Dort; and died in 1676, aged 87. He wrote a great number of works; and was the declared enemy of Des Cartes and his philosophy. His followers are called *Voetians*.

Voetius had two sons, *Daniel* and *Paul*, who also wrote several works. *John Voetius*, the son of Paul, was doctor and professor of law at Herborn: he wrote a commentary on the Pandects, which is esteemed, and other works on law.

VOICE, a sound produced in the throat and mouth of an animal, by an apparatus of instruments for that purpose.

Voices are either articulate or inarticulate. Articulate voices are those whereof several conspire together to form some assemblage or little system of sounds: such are the voices expressing the letters of an alphabet, numbers of which joined together form words. Inarticulate voices are such as are not organized, or assembled into words; such is the barking of dogs, the braying of asses, the hissing of serpents, the singing of birds, &c.

The formation of the human voice, with all the varieties thereof observed in speech, music, &c. makes a very curious article of inquiry; and the apparatus and organism of the parts administering thereto, is something exceedingly surprising. Those parts are the trachea or wind-pipe, through which the air passes and repasses into the lungs; the larynx, which is a short cylindrical canal at the head of the trachea; and the glottis, which is a little oval cleft or chink left between two semicircular membranes stretched horizontally within the larynx; which membranes, though capable of joining close together, do generally leave an interval, either greater or less, between them, called the *glottis*. A particular description of each part may be seen in ANATOMY, Part IV. Sect. 5.

VOICE, in grammar, a circumstance in verbs, whereby they come to be considered as either active or passive, *i. e.* either expressing an action impressed on another subject, as, *I beat*; or receiving it from another, as, *I am beaten*. See GRAMMAR.

VOICE, in matters of election, denotes a vote or suffrage.

VOICE, in oratory. See DECLAMATION; READING, n° 5.; and ORATORY, n° 129—131.

VOLANT, in heraldry, is when a bird, in a coat of arms, is drawn flying, or having its wings spread out.

VOLATILE, in physics, is commonly used to denote a mixed body, whose integrant parts are easily dissipated by fire or heat; but is more properly used for bodies whose parts are easily separated from each other, and dispersed in air.

VOLATILE Alkali, in the new French nomenclature *ammoniac*, one of the three alkaline salts. It consists, as Mr Berthollet and several other chemists have proved, of 807 parts in 1000 of azot, and 193 of hydrogen. Several experiments, published by Dr Priestley, led the way to this analysis, though he himself did not see their result. It is chiefly procurable from animal substances by distillation, during which process the azot and hydrogen necessary to its formation unite in proper proportions; it is not however procured pure by this process, being mixed with oil and water, and mostly saturated with carbonic acid. To separate these substances, it is first combined with an acid, the muriatic for in-

stance, and then disengaged from that combination by the addition of lime or pitch. In its greatest degree of purity it can only exist in a gaseous form, at least in the common temperature of the atmosphere. It was at first obtained chiefly from urine, and was therefore called *sal urina*; afterwards from horns, especially from those of the hart, hence its name, *sal cornu cervi*, "hart's horn." See CHEMISTRY-Index.

VOLATILISATION, the art of rendering fixed bodies volatile, or of resolving them by fire into a fine subtle vapour or spirit which easily dissipates and flies away. All bodies, even the most fixed, as gold, may be volatilised, either of themselves, or with the admixture of some volatile substance or spirit, by distillation or sublimation.

VOLCANO, a name given to burning mountains, or to vents for subterraneous fires.

The number of volcanoes with which we are at present acquainted is very considerable, not much less than 100. In Europe there are *Ætna*, *Vesuvius*, *Hæcla*, *Stromboli*, *Vulcano*; in Asia, one in Mount *Taurus*, three in *Kamtschatka*, five in Japan, two in the Philippines, and a great number more scattered through the islands in the South Sea; in Africa, one in *Fez*, one in the island *Bourbon*, one in *Fuego*, one of the *Cape Verd* islands; and in America several in the *Andes*, *Morne Garou* in *St Vincent*, and two discovered by Captain Cook on the western coast of North America. There are others, but these are best known.

It is remarkable that all the volcanoes with which we are acquainted, four or five perhaps excepted, are situated at a small distance from the sea. Most of them have been burning from time immemorial; some few however have burst out in our time. Volcanoes all occupy the tops of mountains, we find none of them in plains; some of them indeed, which are situated in the ocean, do not rise much above the surface; but even these volcanoes seem to be the apices of mountains, the greater part of which are covered by the sea. The substances ejected by volcanoes are fixed and inflammable air, water, ashes, pumice stones, stones that have undergone no fusion, and lava. The phenomena which take place during the eruptions of volcanoes have been so fully described already in the articles *Ætna*, *Hæcla*, *Iceland*, and *Vesuvius*, that any repetition here would be unnecessary and improper. All that remains, therefore, is to explain the causes of volcanoes, or, to speak more properly, to mention the opinions of philosophers concerning the causes of volcanoes; for the real cause, we are afraid, after all that has been done, remains still unknown. The most elaborate theory that has yet appeared is that of M. Houel*.

According to him, water is necessary for the formation of volcanoes. All volcanoes are near the sea: they are even extinguished when the sea retires from them, for we can still perceive the craters of volcanoes in several lofty inland mountains, which discover what they have been formerly. He supposes that a long series of ages was necessary for the formation of a volcano, and that they were all formed under the surface of the sea. The first explosion which laid open the foundations of the deep, would possibly be preceded by an earthquake. The waters would be parted by a vast globe of burning air, which would issue forth with a tremendous noise, opening at the same time a large and wide vent for the immense flame that was to follow; and which, as it issued from the bottom of the sea, would be spread over its surface by the first gusts of wind which followed. A fire which was to burn through thousands of years, could not be faint or feeble when it was first lighted up. Its first eruptions therefore have undoubtedly been very violent, and the ejected matter very copious. For a long series of ages it would continue to discharge torrents of lava from the bosom

Volatilisation,
Volcano.

* Voyage
Pictureesque.

Supposed
method of
their formation.

Volcano.

bosom of its native earth; and its first crater would be composed of the fragments of the same earth.

2
Why the
fire is not
extinguish-
ed by the
waters of
the ocean.

Thus, according to our author, the foundations of the burning mountain would be laid in the bottom of the sea; and even then it would have an hollow cup or crater on the top similar to that which is to be found on all volcanoes at present. But the question now very naturally occurs, by what means was the internal fire preserved from extinction by the waters of the ocean, which must thus have been incumbent upon it? To this he replies, that "The fire, having disposed the substances in fusion to make an eruption, next laid open the earth, and emitted as much matter as it could discharge, with force sufficient to overcome the resistance of the column of water which would oppose its ascent; but as the strength of the fire diminished, the matter discharged was no longer expelled beyond the mouth; but, by accumulating there, soon closed up the orifice. Thus only small orifices would be left sufficient for giving vent to the vapours of the volcano, and from which only small bubbles of air could ascend to the surface of the water, until new circumstances, such as originally gave occasion to the eruption of the volcano, again took place in the bowels of the earth, and produced new eruptions either through the same or other mouths. The appearance of the sea over the new formed volcano, in its state of tranquillity, would then be similar to what it is betwixt the islands of Basilizzo and Paritaria. Columns of air-bubbles are there ascending at the depth of more than 30 feet, and burst on their arriving at the surface. This air would continue to disengage itself with little disturbance as long as it issues forth only in small quantity, until, at the very instant of explosion, when prodigious quantities, generated in the burning focus, would make their way all at once, and the same phenomena which originally took place would again make their appearance."

3
Ebullition
of the sea
by the for-
mation of a
volcano.

4
Action of
submarine
volcanoes.

A volcano, while under water, cannot act precisely as it does in the open air. Its eruptions, though equally strong, cannot extend to so great a distance. The lava accumulates in greater quantity round the crater; the sands, ashes, and pozzolano are not carried away by the winds, but are deposited around its edges, and prevent the marine substances which are driven that way by the waters from entering. Thus they agglomerate with these bodies, and thus a pyramidal mount is formed of all the materials together.

In this manner Mr Houel supposes that the mountain was gradually raised out of the sea by the accumulation of lava, &c. at every eruption, and that the cavern of the volcano was gradually enlarged, being driven down into the bottom of the cavern by the continued action of the stones which the volcano is constantly throwing up; that it was there fused, and at last thrown out at the top of the mountain to accumulate on its sides. Mr Houel's opinion about the volcanic fire we shall give in his own words.

"We cannot form any idea of fire subsisting alone, without any pabulum, and unconnected with any other principle. We never behold it but in conjunction with some other body, which nourishes and is consumed by it. The matter in fusion, which issues from the focus, is but the incombustible part of that which nourishes the fire, and into the bosom of which that active principle penetrates in search of pabulum. But as the fire acts only in proportion to the facility with which it can dissolve and evaporate, I am of opinion, that it is only the bottom of the volcano on which it acts; and that its action extends no farther than to keep these substances which it has melted in a constant state of ebullition. That fusible matter being discharged from the mouth of the volcano, and hardening as it is gradually cooled by the action of the air, produces that species of stones which are distinguished by the name of *lavas*. This lava, even when in

5
Formation
of lava.

the focus, and in a state of fluidity, must also possess a certain degree of solidity, on account of the gravity and density of its particles. It therefore opposes the fire with a degree of resistance which irritates it, and requires, to put it into a state of ebullition, a power proportioned to the bulk of the mass.

"That quantity of matter, when dissolved by the action of the fire, must constantly resemble any other thick substance in a state of ebullition. Small explosions are produced in various parts over the surface of every such substance while in a state of ebullition; and, by the bursting of these bubbles, a great number of small particles are scattered around. This is the very process carried on in the focus of a volcano, though on a scale immensely more large; and the vast explosions there produced expel every body which lies in their way with the utmost violence; nor is there any piece of lava which falls down from the upper part of the arch of weight sufficient to resist this violent centrifugal force.

"No estimate can be made of the power of these explosions, but by observing the obstacles they overcome, and what enormous bodies are raised up and thrown to an immense height and distance. Such vast pieces of lava are to be seen on the top of Vesuvius and Lipari, that the projectile force by which they have been thrown out appears altogether incredible. No person can harbour the least suspicion of their having been laid there by any human power; and the appearance of them demonstrates that they have been ejected from the bottom of the volcano, not in a state of fusion, but coherent and solid. A piece of lava lies on the top of *Ætna* of more than a cubic fathom in bulk, and whose weight therefore cannot be less than 16 tons. What an amazing force then must it have required, not only to raise this enormous mass from the volcanic focus, but to make it describe a parabola of about a league in diameter after it had come out of the crater?

6
Incredible
force of
volcanic ex-
plosions.

"When we consider how much the volcanic focus is sunk below the base of the mountain, that the mountain itself is 10,000 feet high, and that consequently there must have been a power sufficient to raise such a mass 12,000 feet perpendicular, the boldest imagination must be lost in amazement.—This may serve to give us some idea of the nature of that power which operates in the foci of volcanoes; a power which is unknown and inconceivable, and may justly be reckoned among the mysteries of nature."

The pabulum by which the internal fire is supported, Mr Houel thinks to be substances contained in the mountain itself, together with bitumen, sulphur, and other inflammable materials which may from time to time flow into the focus of the volcano in a melted state through subterraneous ducts, and the explosions he ascribes to water making its way in the same manner. The water is converted into steam, which fills the cavern and pushes the melted lava out at the crater; this opinion is corroborated by the copious smoke which always precedes an eruption. But, combined with the water, there is always a quantity of other substances, whose effects precede, accompany, or follow the eruptions, and produce all the various phenomena which they display. The eruption of water from *Ætna* in the year 1775 proceeded undoubtedly from this cause. The sea, or some of the reservoirs in *Ætna* or the adjacent mountains, by some means discharged a vast quantity of water into the focus of the volcano. That water was instantly resolved into vapour, which instantly filled the whole cavern, and issued from the mouth of the crater. As soon as it made its way into the open atmosphere, it was condensed again into water, which streamed down the sides of the mountain in a dreadful and destructive torrent.

7
Eruption of
water from
Ætna in
1775 ex-
plained.

Thus

Volcano.

Thus we have given a view of Mr Houel's theory, according to which volcanoes originally began at the bottom of the sea; and not only the mountain, but all the adjoining country, was formed by successive eruptions. It is rather a theory of mountains raised by subterraneous heat than of volcanoes, and does not attempt to explain the origin of the fire, which is the principal difficulty; neither does his theory account for the immense height to which matters are sometimes thrown during eruptions. This indeed it is impossible to account for, without supposing that the resistance of the air is diminished. The excessive opposition of the atmosphere to bodies moving with very great degrees of velocity has been taken notice of under the article GUNNERY. If it has so much effect then upon solid and round globes of iron, what ought it to be on irregular masses of rock, or streams of liquid lava? Nevertheless, in the great eruption of Vesuvius in 1779, Sir William Hamilton informs us, that a vast stream of lava was projected to the height of at least 10,000 feet above the top of the mountain. Had the air resisted this liquid matter as it does a cannon-ball, it must have been dashed in pieces almost as soon as it issued from the crater. Either the extreme heat of the lava, therefore, or some other cause, must have contributed very much to diminish, or rather, in a manner to annihilate the resistance of the atmosphere at that time. As for the lighter materials, though they may be supposed to be carried to a vast distance by the wind, after being projected to a great height in the air, it is inconceivable how their motion was not suddenly stopped, and they scattered all around the top of the volcano by the violence of the blast. Substances of this kind, when quietly carried up with smoke, will indeed fly to a great distance; for we are assured, that the ashes of the great fire at London in 1666 were carried by the wind to the distance of 16 miles. It is therefore the less incredible, that those of the great eruption of Vesuvius in 1779 should be carried to the distance of 100 miles, as we are informed was the case.

8
Central
fire suppo-
sed to be
the cause.

To account for the volcanic fire, Dr Woodward and others have had recourse to the hypothesis of a central fire, to which the volcanoes are only so many chimneys or spiracles. Dr Hutton, in his theory of the earth, adopts the same opinion; but as it did not immediately concern the subject of which he treated, he evades any question concerning its origin, by declaring himself satisfied of its existence without any inquiry into its origin.

9
Beds of py-
rites, &c.

Others, as Dr Lister, have had recourse to the well known experiment of the fermentation of sulphur and iron, which will take fire when mixed in considerable quantity, and moistened with water. Pyrites, therefore, which are a natural mixture of these two substances, it is supposed, may naturally give rise to volcanoes. Instances are indeed adduced, which undeniably prove that these substances will spontaneously take fire when thrown together in large heaps. Of this we have a remarkable example in the following anecdote.—"A covetous copperas maker at Deptford having bought up all the pyrites he could find, in order to ruin the trade of his neighbours, collected a vast quantity below a shade in order to secure them from the rain. He was soon, however, punished for his avarice; for the pyrites began to smoke, glowed like red-hot coals, and melted into a kind of vitrified and partly metallic substance, grievously annoying the neighbourhood for a long time with the sulphureous steam they emitted." Beds of pyrites, therefore, taking fire in the earth by means of a fermentation occasioned by water, are now generally supposed to be the cause of volcanoes; and the observation, that volcanoes are generally near the sea, is thought to confirm this hypothesis.

10
Great
quantities
of pyrites
will take
fire sponta-
neously.

When the matter is properly considered, however, it must

be evident, that neither of these hypotheses can answer the purpose. The central fire of Dr Woodward and others is a cause too magnificent even for volcanoes. If any such fire is supposed, we must imagine a burning globe in the centre of the earth, whose heat is sufficient to vitrify the most solid and refractory terrestrial substances. But of what dimensions are we to suppose this globe? Is it one, two, three, four, or more thousands of miles in diameter?—Very large indeed it must be; for we could scarce suppose that stones could be projected even from the depth of 500 miles into the air. But even this supposition is inadmissible; for as the fire of volcanoes is at times exceedingly augmented from some cause or other, were this cause general, as it must be in case of a burning central globe, the whole number of volcanoes existing on earth would be in a state of eruption at once. Besides, if we were to suppose a burning globe of 7000 miles in diameter to suffer the least dilatation throughout its vast bulk, which must be the undoubted consequence of an augmentation of heat from any unknown cause, all the volcanoes in the world would not be sufficient to give vent to it, though they should spout forth incessant cataracts of lava for centuries together. A dissolution of the whole globe must therefore undoubtedly take place; and though we should lessen the diameter of our burning globe by 1000 miles, our difficulties will be as far from being removed as before.

Volcanic fire, therefore, cannot originate from any general collection of burning materials dispersed throughout the vast mass of solid earth which lies betwixt the surface and the centre. All the volcanoes at present in an active state would not be such a vent for that fire as a tobacco-pipe would be to a glass-house furnace. We must have recourse then to some operation by which we know that nature can kindle and extinguish fires occasionally; and if we can suppose such an operation to take place in the bowels of the earth, we may then reasonably conclude, that we have discovered a cause adequate to the production of volcanoes. Such a cause, however, cannot be pyrites, sulphur, or nitre, in any quantity under the surface of the earth. It is impossible that beds of pyrites can remain for thousands of years under the same part of the surface of the earth, be occasionally inflamed and ejected, and afterwards undergo a renovation, in order to enable them to go through a similar operation. Nitre is never found in a fossil state; nor can it be inflamed in such a manner as to make any considerable explosion without a thorough mixture with sulphur and charcoal; neither would all the quantity which we can suppose to exist under the base of any mountain in the world be sufficient to give force to one of those dreadful volleys which are discharged by volcanoes an hundred times in a day. Besides, neither pyrites nor sulphur can be inflamed without access of air; which cannot take place in the bowels of the earth; for it must be remembered, that the first question is concerning the means by which the fire was originally kindled. Most writers, however, seem to overlook this difficulty, and to be solicitous only about the immediate cause of the explosive force, which is generally ascribed to steam of one kind or other. Mr Houel in general calls it the force of fire, or of steam; concerning though he does not enter very particularly into its nature. Mr Whitehurst says, that it is the force of "fire and water," which is the primary agent in all such operations of nature. He also gives a figure, showing how, by means of confined steam, a jet, either of hot water or of liquid fire, may be produced. But this applies only to a particular case, which we cannot suppose always to happen; but volcanoes are constantly attended with explosions; nay, so great is the tendency of volcanic matters to this violent operation, that many stones have been observed to burst in the air like

Volcano.
11
Volcanoes
not occa-
sioned by
central fire.

12
They can-
not be set
on fire by
pyrites, sul-
phur, or
nitre.

13
Hypotheses
concerning
the cause
of the ex-
plosive
force.

14
Great ten-
dency of
volcanic
matters to
explosion.

bombs,

Volcano bombs, after they were thrown out of the volcano; and Mr Houel even informs us, that such have burst three times during their flight. Water therefore cannot be always the cause of volcanic explosions. When thrown upon melted lead, salts, or especially copper, it explodes indeed with vast force. With the last mentioned metal it is peculiarly and incredibly violent; inasmuch, that it is said that furnaces have been burst, and buildings thrown down, by the mere circumstance of some of the workmen spitting among the melted metal; and Mr Whitehurst calculates the force of aqueous steam, when thus suddenly and violently heated, to be no less than 28 times stronger than inflamed gunpowder.

Many philosophers attempt to account for the origin and continuance of volcanoes by the agency of the electric fluid; but their theory is so ill supported by facts, that we think it would be improper at present to take up room with detailing it. It is certain that volcanoes exhibit many electrical appearances, and that great quantities of the electrical fluid are discharged at every eruption. But our knowledge of electricity is still too limited to draw any certain conclusion from these appearances.

VOLERY, a great bird-cage, so large that the birds have room to fly up and down in it.

VOLGA, the largest river in Europe, rises in the forest of Volkonski, about 80 miles from Tver, a town in Russia. This noble river waters some of the finest provinces in the Russian empire, and at last falls into the Caspian Sea by several mouths, below Astracan.

VOLITION, the act of willing. See METAPHYSICS.

VOLLEY, a military salute, made by discharging a great number of fire-arms at the same time.

VOLONES, in Roman antiquity, slaves who in the Punic war voluntarily offered their service to the state, which is the reason of the appellation; upon which they were admitted to citizenship, as none but freemen could be soldiers.

VOLT, in the manege, a round or circular tread; and hence, by the phrase *to make volts*, is understood a gate of two treads, made by a horse going sidewise round a centre, in such a manner that these two treads make parallel tracts; one larger, made by the fore-feet, and another smaller made by the hind-feet; the croup approaching towards the centre, and the shoulders bearing out.

VOLTAIRE (Francis Arouet de), a celebrated French author, was born at Paris, February 20. 1694. His father, Francis Arouet, was *ancien notaire au Chatelet*, and treasurer of the chamber of accounts; his mother, Mary-Margaret Draumart. At the birth of this extraordinary man, who lived to the age of 85 years and some months, there was little probability of his being reared, and for a considerable time he continued remarkably feeble. In his earliest years he displayed a ready wit and a sprightly imagination; and, as he said of himself, made verses before he was out of his cradle. He was educated, under Father Poré, in the college of Louis the Great; and such was his proficiency, that many of his essays are now existing, which, though written when he was between 12 and 14, show no marks of infancy. The famous Ninon de l'Enclos, to whom this ingenious boy was introduced, left him a legacy of 2000 livres to buy him a library. Having been sent to the equity schools on his quitting college, he was so disgusted with the dryness of the law, that he devoted himself entirely to the muses. He was admitted into the company of the Abbé Cheaulieu, the marquis de la Fare, the duke de Sully, the grand Prior of Vendôme, marshal Villars, and the chevalier du Bouillon; and caught from them that easy taste and delicate humour which distinguish-

ed the court of Louis XIV. Voltaire had early imbibed a turn for satire; and, for some Philippics against the government, was imprisoned almost a year in the Bastille. He had before this period produced the tragedy of *Oedipus*, which was represented in 1718 with great success; and the duke of Orleans happening to see it performed, was so delighted, that he obtained his release from prison. The poet waited on the duke to return thanks; "Be wise (said the duke) and I will take care of you." "I am infinitely obliged (replied the young man); but I intreat your royal highness not to trouble yourself any further about my lodging or board."

He began his *Henriade* before he was 18. Having one day read several cantos of this poem when on a visit to his intimate friend, the young president de Maisons, he was so teased with objections, that he lost patience, and threw his manuscript into the fire. The president, Henaut, with difficulty rescued it. "Remember (said Mr Henaut to him, in one of his letters) it was I that saved the *Henriade*, and that it cost me a handsome pair of ruffles." Some years after, several copies of this poem having got abroad, while it was only a sketch, an edition of it was published, with many chasms, under the title of *The League*. Instead of fame and friends, the author gained only enemies and mortification, by this first edition. The bigots took fire at it, and the poet was considered as highly criminal for praising admiral Coligny and queen Elizabeth. Endeavours were even used to get the piece suppressed; but this strange design proved abortive. His chagrin, on this occasion, first inspired him with the thought of visiting England, in order to finish the work, and republish it in a land of liberty. He was right; for king George I. and more particularly the princess of Wales, afterwards queen of England, raised an immense subscription for him. Their liberality laid the foundation of his fortune; for on his return to France in 1728, he put his money into a lottery established by M. Desfortes, comptroller-general of the finances. The adventurers received a rent charge on the *Hotel-de-Ville* for their tickets; and the prizes were paid in ready money; so that if a society had taken all the tickets, it would have gained a million of livres. He joined with a numerous company of adventurers, and was fortunate.

His *Lettres Philosophiques*, abounding in bold expressions and indecent witticisms against religion, having been burnt by a decree of the parliament of Paris, and a warrant being issued for apprehending the author in 1733, Voltaire very prudently withdrew; and was sheltered by the marchioness du Chatelet, in her castle of Cirey, on the borders of Champagne and Lorraine, who entered with him on the study of the system of Leibnitz, and the principia of Newton. A gallery was built, in which Voltaire formed a good collection of natural history, and made an infinite number of experiments on light and electricity. He laboured in the mean time on his *Elements of the Newtonian Philosophy*, then totally unknown in France, and which the numerous admirers of Des Cartes were very little desirous should be known. In the midst of these philosophic pursuits he produced the tragedy of *Alzira*. He was now in the meridian of his age and genius, as was evident from the tragedy of *Mabomet*, first acted in 1741; but it was represented to the procureur-general as a performance offensive to religion; and the author, by order of cardinal Fleury, withdrew it from the stage. *Merope*, played two years after, 1743, gave an idea of a species of tragedy, of which few models had existed. It was at the representation of this tragedy that the pit and boxes were clamorous for a fight of the author; yet it was severely criticised when it came from

Voltaire. from the press. He now became a favourite at court, through the interest of madam d'Etiole, afterwards marchioness of Pompadour. He was appointed a gentleman of the bed-chamber in ordinary, and historiographer of France. He had frequently attempted to gain admittance into the Academy of Sciences, but could not obtain his wish till 1746, when he was the first who broke through the absurd custom of filling an inaugural speech with the fulsome adulation of Richelieu; an example soon followed by other academicians. From the satires occasioned by this innovation he felt so much uneasiness, that he was glad to retire with the marchioness du Chatelet to Luneville, in the neighbourhood of king Stanislaus. The marchioness dying in 1749, Voltaire returned to Paris, where his stay was but short. The king of Prussia now gave Voltaire an invitation to live with him, which he accepted towards the end of August 1750. On his arrival at Berlin, he was immediately presented with the *Order of Merit*, the *key of chamberlain*, and a *pension* of 20,000 livres. From the particular respect that was paid to him, his time was now spent in the most agreeable manner; his apartments were under those of the king, whom he was allowed to visit at stated hours, to read with him the best works of either ancient or modern authors, and to assist his majesty in the literary productions by which he relieved the cares of government. But a dispute which arose between him and Maupertuis soon brought on his disgrace. Maupertuis was at some pains to have it reported at court, that one day while general Manstein happened to be in the apartments of M. de Voltaire, who was then translating into French, *The Memoirs of Russia*, composed by that officer, the king, in his usual manner, sent a copy of verses to be examined, when Voltaire said to Manstein, "Let us leave off for the present, my friend; you see the king has sent me his dirty linen to wash, I will wash your's another time." A single word is sometimes sufficient to ruin a man at court; Maupertuis imputed such a word to Voltaire, and succeeded. It was about this very time that Maupertuis published his very strange Philosophical Letters; and M. de Voltaire did not fail to heighten, with his utmost powers of raillery, every thing which he found, or could make, ridiculous, in the projects of M. Maupertuis, who was careful to unite his own cause with that of the king; Voltaire was considered as having failed in respect to his majesty; and therefore, in the most respectful manner, he returned to the king his chamberlain's key, and the cross of his Order of Merit: accompanied with four lines of verse; in which he, with great delicacy, compares his situation to that of a jealous lover, who sends back the picture of his mistress. The king returned the key and the ribbon; but they were not followed by an immediate reconciliation. Voltaire set out to pay a visit to her highness the duchess of Gotha, who honoured him with her friendship as long as she lived. While he remained at Gotha, Maupertuis employed all his batteries against him: Voltaire was arrested by the king's orders, but afterwards released.

He now settled near Geneva; but afterward being obliged to quit that republic, he purchased the castle of Ferney in France, about a league from the lake of Geneva. It was here that he undertook the defence of the celebrated family of Calas; and it was not long before he had a second opportunity of vindicating the innocence of another condemned family of the name of *Sirven*. It is somewhat remarkable, that in the year 1774, he had the third time a singular opportunity of employing that same zeal which he had the good fortune to display in the fatal catastrophe of the families of Calas and Sirven.

In this retreat M. Voltaire continued long to enjoy the

pleasures of a rural life, accompanied with the admiration of a vast number of wits and philosophers throughout all Europe. Wearied at length, however, with his situation, or yielding to the importunities of friends, he came to Paris about the beginning of the year 1778, where he wrote a new tragedy called *Irene*. By this time his understanding seems to have been impaired, either through the infirmities of age, or continued intoxication by the flattery of others; and he ridiculously suffered himself to be crowned in public with laurel, in testimony of his great poetical merit. He did not long survive this farce: for having overheated himself with receiving visits, and exhausted his spirits by supplying a perpetual fund of conversation, he was first seized with a spitting of blood; and at last becoming restless in the night-time, he was obliged to use a soporific medicine. Of this he unluckily one night took so large a dose, that he slept 36 hours, and expired a very short time after awakening from it.

VOLUME, in matters of literature, a book or writing of a just bulk to be bound by itself. The name is derived from the Latin *volvere*, "to roll up;" the ancient manner of making up books being in rolls of bark or parchment. See *Book*.

VOLUNTARY, in music, a piece played by a musician extempore, according to his fancy. This is often used before he begins to set himself to play any particular composition, to try the instrument, and to lead him into the key of the piece he intends to perform.

VOLUNTEERS, persons who, of their own accord, either for the service of their prince, or out of the esteem they have for their general, serve in the army without being enlisted, to gain honour and preferment, by exposing themselves in the service.

Such are the volunteers who have been long known in the army; but the present age has witnessed whole regiments of volunteers arming themselves for a still more laudable purpose. In consequence of those democratical principles which, in 1793, had been imported into Scotland from the Jacobins of France, a number of gentleman in Edinburgh, eminent for their rank and respectability of character, associated themselves for the purpose of preserving the internal peace of the city. Making their object known to government, they were, in 1794, embodied in a regiment, called *THE ROYAL EDINBURGH VOLUNTEERS*, with officers appointed by his majesty; and so assiduous were they in learning the exercise of the army, that, without incurring the imputation of national prejudice, we may venture to affirm, that there is not in the king's service a regiment better disciplined or more alert in their evolutions than the Edinburgh Volunteers, who consist of lawyers, physicians, and opulent tradesmen, attached to their king and the constitution of their country. They amount at present (1796) to 850. The example of the metropolis was quickly followed by many of the other towns in Scotland; and in Glasgow, Aberdeen, Stirling, and Perth, &c. there are now volunteer regiments, which have certainly contributed to preserve the internal peace of the country, and are prepared to repel any foreign invasion should an enterprise so daring be ever attempted. Similar armaments have been formed, we believe, in many of the towns in England; and Great Britain, at present, can boast a mighty force, which, without receiving the pay of soldiers, is ready to fight *pro aris et focis*.

VOLVOX, in zoology; a genus of animals belonging to the order of *vermes infusoria*. The body is round, simple, and pellucid. There are ten species, all of which live in water.

VOLUSENUS. See *WILSON*.

VOLUTA, in natural history; a genus of animals belonging

Volute
||
Vossius.

longing to the class and order of *vermes testacea*. There are 144 species. The animals are of the slug kind; the shell is unilocular and spiral; the aperture narrow and without a beak: the columella plaited.

VOLUTE, in architecture, a kind of spiral scroll used in the Ionic and Composite capitals, whereof it makes the principal characteristic and ornament.

VOMICA, in medicine, an abscess of the lungs. See **MEDICINE**, n° 186.

Nux Vomica, in pharmacy, a flat compressed round fruit, of the breadth of a shilling, or somewhat more, and of about the thickness of a crown-piece.

It is the nucleus of a fruit of an East-Indian tree, the wood of which is the *lignum columbrinum* of the shops.

Some have prescribed small doses of the *nux vomica* as a specific against a gonorrhœa, and others against quartan agues. But we have so many good and safe medicines for all these purposes, that there seems no occasion for our having recourse to such as these, which show so many signs of mischief.

VOMIT. See **EMETIC**.

VOMITING, a retrograde spasmodic motion of the muscular fibres of the œsophagus, stomach, and intestines, attended with strong convulsions of the muscles of the abdomen and diaphragm; which, when gentle, create a nausea; when violent, a vomiting.

VOORN, one of the islands of Holland, bounded by the river Maes, which divides it from the continent and the island of IJemunde, on the north; by the sea called the *Bies-bosch*, on the east; by another branch of the Maes, which divides it from the islands of Goree and Overflackee, on the south; and by the German sea on the west; being about 24 miles long, and 5 broad.

VORTEX, in meteorology, a whirlwind, or sudden, rapid, and violent motion of the air in gyres, or circles.

Vortex is also used for an eddy or whirlpool; or a body of water, in certain seas or rivers, which run rapidly around, forming a sort of cavity in the middle.

VORTEX, in the Cartesian philosophy, is a system or collection of particles of matter moving the same way, and round the same axis.

VORTICELLO. See **MICROSCOPE**, Vol. XI. page 745.

VOSSIUS (John Gerard), one of the most learned and laborious writers of the 17th century, was of a considerable family in the Netherlands; and was born in 1577, in the Palatinate, near Heidelberg, at a place where his father, John Vossius, was minister. He became well skilled in polite literature, history, and sacred and profane antiquities, and was made director of the college of Dort. He was at length made professor of eloquence and chronology at Leyden, from whence he was called in 1633 to Amsterdam, to fill the chair of a professor of history. He died in 1649. He wrote many learned works, of which a complete edition has been printed at Amsterdam, in 9 vols folio.

Vossius (Isaac), a man of great parts and learning, the son of John Gerard Vossius, was born at Leyden in 1618. He had no other tutor but his father, and employed his whole life in studying: his merit recommended him to a correspondence with queen Christina of Sweden; he made several journeys into Sweden by her order, and had the honour to teach her the Greek language. In 1670 he came over to England, where king Charles made him canon of Windsor; though he knew his character well enough to say, That there was nothing that Vossius refused to believe, excepting the Bible. He appears indeed by his publications, which are neither so useful nor so numerous as his father's, to have been a most credulous man, while he afforded

many circumstances to bring his religious faith in question. He died at Windsor castle in 1688.

VOTE, the suffrage or resolve of each of the members of an assembly, where any affair is to be carried by a majority; but more particularly used for the resolves of the members of either house of parliament.

VOTIVE MEDALS, those on which are expressed the vows of the people for the emperors or empresses. See **MEDAL**.

VOW, a solemn and religious promise or oath. See **OATH**.

The use of vows is found in most religions. They make up a considerable part of the Pagan worship, being made either in consequence of some deliverance, under some pressing necessity, or for the success of some enterprise. Among the Jews, all vows were to be voluntary, and made by persons wholly in their own power; and if such person made a vow in any thing lawful and possible, he was obliged to fulfil it. If he appointed no particular time for accomplishing his vow, he was bound to do it instantly, lest by delay he should prove less able, or be unwilling, to execute his promise. Among the Romanists, a person is constituted a religious by taking three vows; that of poverty, chastity, and obedience.

Vows, among the Romans, signified sacrifices, offerings, presents, and prayers made for the Cæsars, and emperors, particularly for their prosperity and the continuance of their empire. These were at first made every 5 years, then every 15, and afterwards every 20, and were called *quinquennialia*, *decennialia*, and *vincennialia*.

VOWEL, in grammar, a letter which affords a complete sound of itself, or a letter so simple as only to need a bare opening of the mouth to make it heard, and to form a distinct voice. The vowels are six in number, viz. A, E, I, O, U, Y.

VOWEL (John). See **HOOKE**.

UPHOLSTER, **UPHOLSTERER**, or *Upholder*, a tradesman that makes beds, and all sorts of furniture thereunto belonging, &c.

UPLAND, denotes high ground, or, as some call it, *terra firma*, by which it stands opposed to such as is moorish, marshy, or low.

UPLAND, a province of Sweden, bounded on the north-east by the Baltic Sea, on the south by the sea of Sudermania, and on the west by Westmania and Gestricia, from which it is separated by the river Dela. It is about 70 miles in length and 45 in breadth, and contains mines of iron and lead. Stockholm is the capital.

UPSAL, a rich and considerable city of Sweden, in Upland, with a famous university, and an archbishop's see. The town is pretty large, and as straight as a line; but most of the houses are of wood, covered with birch-bark, with turf on the top. On an eminence, to the south of the town, is a ruined castle. Those that view the town from hence would take it to be a garden, whose streets represent the alleys; and the houses, which are covered with turf, the grass-plats. It was formerly the residence of the kings, and is now the usual place where they are crowned. It is seated on the river Sala, over which there are two bridges. It is 27 miles north-west of Stockholm. E. Long. 17. 48. N. Lat. 59. 52.

UPUPA, in ornithology; a genus belonging to the order of *pica*. The beak is arcuated, convex, and something blunt; the tongue is obtuse, triangular, entire, and very short; and the feet are fitted for walking. There are ten species; one of which, the *epops*, hoopoe, or dung-bird, is frequently seen in Britain. It may be readily distinguished from all others that visit this island by its beautiful crest, which it can erect

Vote
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Upupa.

Ur
||
Uranium.

or depress at pleasure. It is in length 15 inches; the bill is black, two inches and a half long, slender, and incurvated; the irides are hazel: the crest consists of a double row of feathers; the highest about two inches long; the tips are black, their lower part of a pale orange colour: the neck is of a pale reddish brown; the breast and belly white; the lesser coverts of the wings are of a light brown; the back, scapulars, and wings, crossed with broad bars of white and black; the rump is white; the tail consists of only 10 feathers, white marked with black, in form of a crescent, the horns pointing towards the end of the feathers. The legs are short and black; the exterior toe is closely united at the bottom to the middle toe.

According to Linnæus, it takes its name from its note, which has a sound similar to the word; or it may be derived from the French *huppe*, or "crested:" it breeds in hollow trees, and lays two ash-coloured eggs: it feeds on insects, which it picks out of ordure of all kinds. Dr Pallas affirms, that it breeds in preference in putrid carcases; and that he had seen the nest of one in the privy of an uninhabited house, in the suburbs of Tzaritsyn.

Ovid says that Tereus was changed into this bird:

*Vertitur in volucrem, cui stant in vertice cristæ,
Prominet immodicum pro longa cuspidæ rostrum:
Nomen epops volucris.* Metam. lib. vi. l. 672.

Tereus, through grief and haste to be reveng'd,
Shares the like fate, and to a bird is chang'd.
Fix'd on his head the crested plumes appear.
Long is his beak, and sharpen'd as a spear. *Croxall.*

UR (anc. geog.), a citadel of Mesopotamia, situated between the Tigris and Nisibis; taken by some for Ur of the Chaldees, the residence of Abraham. What seems to confirm this is, that from Ur to Haran, the other residence of the patriarch, the road lies directly for Palestine. And it is no objection that Ur is said to be in Mesopotamia; because the parts next the Tigris were occupied by the Chaldeans, as seems to be confirmed from Acts vii. 2, 4. It is called *Orche*, in Strabo; *Orchoe*, in Ptolemy.

URALLIAN CHAIN, a range of mountains which form part of the boundaries of Asia, and anciently known by the name of *Riphaei Montes*. See *RIPHAÏ Montes*, &c.

URANIA, in fabulous history, one of the nine Muses, was supposed to preside over astronomy. She is commonly represented in an azure robe, crowned with stars, and supporting a large globe with both hands.

URANIUM, a fossil found at Johangeorgenstad in Saxony, and at Joachimstal in Bohemia, and is, by the miners, called *Pechblend*. M. Werner, a German mineralogist, being convinced that it was not a blend, gave it the name of *Ferrum Ochraceum Piceum*, and thought it contained the tungstic acid combined with iron: but M. Klaproth is of a contrary opinion, and maintains that it is very different from wolfram. There are (he says) two varieties of pechblend: the one is of a dark grey colour, with very little brilliancy, the particles of which have the form of a flattened conchoid; it is not very hard, and, when triturated, becomes a black powder: its mean specific gravity is 7,5. The other is distinguished by its black colour, though it sometimes assumes a reddish tint: its surface is more brilliant than that of the former, and resembles pit-coal; it is also less hard; and the black powder, to which it is reduced by trituration, has a greenish hue. This kind is generally discovered in compact masses, lying between strata of a micaceous schist, which is found to be decomposed. In the internal parts of this stone, it is not uncommon to meet with veins of a peculiar yellow metallic earth. The pechblend is

soluble in the nitric and in the nitro-muriatic acids, partially so in the muriatic, but not at all in the sulphuric. From these solutions, the unsaturated ferruginous prussiat of potash, or phlogisticated alkali, precipitates the metallic substance, which then resembles kermes mineral in colour. This, when it does not unite in flakes, but is uniformly diffused in the solution, may be considered as one of the most distinguishing characters of the pechblend; another is, that the precipitates, effected by the volatile and fixed alkalis, are yellow; the fixed caustic alkalis giving it a lemon colour, the aerated a like yellow. This yellow oxyd, or calx, cannot be fused with alkalis. As this fossil cannot be classed either among the zinc or iron ores, and is very different from tungstein, M. Klaproth proposes to give to it the appellation of *Uranium*; and he distributes it into the following species:

1. *Uranium sulphuratum*. (a) Dark gray, often exhibiting traces of Galena. (b) Black, resembling pit-coal.
2. *Uranium Ochraceum*. Brimstone colour, lemon colour, deep yellow, reddish brown.
3. *Uranium Spathosum*. (a) Tinged with green by copper. (b) Yellow. This is the green mica or chalcolithes.

URANOSCOPUS, in ichthyology, a genus of fishes belonging to the order of *jugulares*. The head is large, rough, and depressed, the upper jaw being shorter than the under one; there are six dentated rays in the membrane of the gills; and the anus is in the middle of the body. There are two species, one of which is found in the Mediterranean Sea.

RAPHAEL D'URBINO. See RAPHAEL.

URCHIN, in zoology. See ECHINUS.

URETERS, in anatomy. See ANATOMY, n° 101.

URETHRA, in anatomy. See ANATOMY, n° 107.

URIM and THUMMIM, among the ancient Hebrews, a certain oracular manner of consulting God, which was done by the high priest dressed in his robes, and having on his pectoral or breast-plate.

Various have been the sentiments of commentators concerning the urim and thummim. Josephus, and several others, maintain, that it meant the precious stones set in the high-priest's breast-plate, which by extraordinary lustre made known the will of God to those who consulted him. Spencer believes that the urim and thummim were two little golden figures shut up in the pectoral as in a purse, which gave responses with an articulate voice. In short, there are as many opinions concerning the urim and thummim as there are particular authors that wrote about them. The safest opinion, according to Broughton, seems to be, that the words *urim* and *thummim* signify some divine virtue and power annexed to the breast-plate of the high-priest, by which an oracular answer was obtained from God when he was consulted by the high-priest; and that this was called *urim* and *thummim*, to express the clearness and perfection which these oracular answers always carried with them; for *urim* signifies "light," and *thummim* "perfection:" these answers not being imperfect and ambiguous, like the heathen oracles, but clear and evident. The use made of the urim and thummim was to consult God in difficult cases relating to the whole state of Israel; and sometimes in cases relating to the king, the sanhedrim, the general of the army, or some other great personage.

URINAL, in medicine, a vessel fit to receive and hold urine, and used accordingly for the convenience of sick persons. It is usually of glass, and crooked; and sometimes it is filled with milk, to assuage the pain of the gravel.

URINAL, in chemistry, is an oblong glass vessel, closed for making solutions, and so called from its resemblance to the glasses in which urine is set to settle for the inspection of the physician.

Uranosco-
pus
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Urinal.

Urine
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Urinus.

URINE, a serous and saline fluid, separated from the blood, and carried by the emulgent arteries to the kidneys, from whence it descends to the bladder by the ureters, and is from time to time emitted thence by the canal of the urethra. See ANATOMY, n° 107. For the analysis of urine, see CHEMISTRY.

URN, a kind of vase, of a roundish form, but biggest in the middle, like the common pitchers, now seldom used but in the way of ornament over chimney-pieces, in buffets, &c. The great use of urns among the ancients, was to preserve the ashes of the dead after they were burnt; for which reason they were called *cineraria*, and *urna cineraria*, and were placed sometimes under the tomb-stone whereon the epitaph was cut; and sometimes in vaults in their own houses. Urns were also used at their sacrifices to put liquid things in.

UROGALLUS, in ornithology. See TETRAO.

URSA, in astronomy, the name of two constellations in the northern hemisphere.

URSULINES, is church history, an order of nuns, founded originally by St Angela of Brescia, in the year 1537; and so called from St Ursula, to whom they were dedicated.

URSUS, the BEAR; a genus of quadrupeds belonging to the order of *fera*. There are six fore-teeth in the upper jaw, alternately hollow in the inside, and six in the under jaw, the two lateral ones being lobated. The dog-teeth are solitary and conical; the eyes are furnished with a nictitating membrane; the nose is prominent; and there is a crooked bone in the penis. There are eight species; the principal of which are,

1. *Arctos*, the black bear, has strong, thick, and clumsy limbs; very short tail; large feet; body covered with very long and shaggy hair, various in its colour: the largest are of a rusty brown; the smallest of a deep black: some from the confines of Russia black, mixed with white hairs, called by the Germans, *silver bear*; and some (but rarely) are found in Tartary of a pure white. It inhabits the north parts of Europe and Asia; the Alps of Switzerland, and Dauphine; Japan and Ceylon; North America and Peru. The brown bears are sometimes carnivorous, and will destroy cattle, and eat carrion; but their general food is roots, fruits, and vegetables: they will robe the fields of pease; and when they are ripe, pluck great quantities up, beat the pease out of the husks on some hard place, eat them, and carry off the straw: they will also, during winter, break into the farmer's yard, and make great havock among his stock of oats; they are also particularly fond of honey. The flesh of a bear in autumn, when they are excessively fat, by feeding on acorns, and other mast, is delicate food; and that of the cubs still finer; but the paws of the old bears are reckoned the most exquisite morsel; the fat white, and very sweet; the oil excellent for strains and old pains. The latter end of autumn, after they have fattened themselves to the greatest degree, the bears withdraw to their dens, where they continue for a great number of days in total inactivity and abstinence from food, having no other nourishment than what they get by sucking their feet, where the fat lodges in great abundance; their retreats are either in cliffs of rocks, in the deepest recesses of the thickest woods, or in the hollows of ancient trees, which they ascend and descend with surprising agility: as they lay in no winter-provisions, they are in a certain space of time forced from their retreats by hunger, and come out extremely lean: multitudes are killed annually in America, for the sake of their flesh or skin; which last makes a considerable article of commerce.

2. *Maritimus*, the polar or white bear, has a long head

and neck; short round ears; great teeth; the hair long, soft, and white, tinged in some parts with yellow: growing to a vast size; the skins of some being 13 feet long. See Plate DX. fig. 3.

This animal is confined to the coldest part of the globe; it has been found as far as navigators have penetrated northwards, above lat. 80. The frigid climes only seem adapted to its nature; for we do not learn from any authority that it is met with farther south than Newfoundland. Its bounds in respect to longitude are also very limited; being an animal unknown except on the shores of Hudson's Bay, Greenland, and Spitzbergen, on one side, and those of Nova Zembla on the other; for such as have appeared in other parts have been brought there involuntarily on floating islands of ice; so that the intermediate countries of Norway and Iceland are acquainted with them but by accident. We cannot trace them farther east than Nova Zembla; though the frozen sea, that is continued from thence as far as the land of Tschuktschi, that lies above Kamtschatka, is equally suited to their nature. The late histories of those countries are silent in respect to them.

During summer, the white bears are either resident on islands of ice, or passing from one to another: they swim admirably, and can continue that exercise six or seven leagues, and dive with great agility. They bring two young at a time: the affection between the parents and them is so strong, that they would die rather than desert one another. Their winter retreats are under the snow, in which they form deep dens, supported by pillars of the same. They feed on fish, seals, and the carcases of whales, and on human bodies, which they will greedily tear up: they seem very fond of human blood; and are so fearless as to attack companies of armed men, and even to board small vessels. When on land, they live on birds and their eggs; and allured by the scent of seals flesh, often break into and plunder the houses of the Greenlanders: their greatest enemy in the brute creation is the morle, with whom they have terrible conflicts, but are generally worsted, the vast teeth of the former giving it a superiority. The flesh is white, and said to taste like mutton: the fat is melted for train-oil, and that of the feet used in medicine: but the liver is very unwholesome, as three of Barentz's sailors experienced, who fell dangerously ill on eating some of it-boiled. One of this species was brought over to England a few years ago; it was very furious, almost always in motion, roared loud, and seemed very uneasy, except when cooled by having pailfulls of water poured on it.

3. The *luscus*, or wolverene, has a black sharp pointed visage; short rounded ears, almost hid in the hairs; the sides of a yellowish brown, which passes in form of a band quite over the hind-part of the back, above the tail; the legs are very strong, thick and short, of a deep black: the whole body is covered with very long and thick hair, which varies in colour according to the season. It inhabits Hudson's Bay and Canada, as far as the straits of Michilimackinac; is found under the name of the *glutton* in the north parts of Europe and Asia, being a native of the most rigorous climates.

It is a most voracious animal, and slow of foot; so is obliged to take its prey by surprise. In America it is called the *beaver-eater*, watching those animals as they come out of their houses, and sometimes breaking into their habitations, and devouring them. It often lurks on trees, and falls on the quadrupeds that pass under; will fasten on the horse, elk, or stag, and continue eating a hole into its body, till the animal falls down with the pain; or else will tear out its eyes: no force can disengage it; yet sometimes the deer in their agony have been known to destroy it, by running their

Ursus,
Urtica.

their head violently against a tree. It devours the isatis, or white fox; searches for the traps laid for the fables and other animals; and is often beforehand with the huntsmen, who sustain great losses by the glutton: authors have pretended that it feeds so voraciously, that at length it is in danger of bursting; and that it is obliged to ease itself of its load, by squeezing it out between two trees.

In a wild state, it is vastly fierce; a terror to both wolf and bear, which will not prey on it when they find it dead, perhaps on account of its being so very fetid, smelling like a pole-cat: it makes a strong resistance when attacked; will tear the stock from the gun, and pull the traps it is caught in to pieces. Notwithstanding this, it is capable of being tamed, and of learning several tricks. It burrows, and has its den under ground. The skin is sold in Siberia for 4s. or 6s.; at Jakutsk for 12s.; and still dearer at Kamtschatka, where the women dress their hair with its white paws, which they esteem a great ornament. The fur is greatly esteemed in Europe: that of the north of Europe and Asia, whose skins are sometimes to be seen in the furriers shops, is much finer, blacker, and more glossy than that of the wolverene, or American kind. The glutton has by some authors been confounded with the hyæna.

4. The *lutor*, or raccoon, has the upper part of the body covered with hair, ash-coloured at the root, whitish in the middle, and tipped with black; tail very bushy, annulated with black; toes black, and quite divided.—It inhabits the warm and temperate parts of America; is found also in the mountains of Jamaica, and in the isles of Maria, between the south point of California and Cape Corientes, in the South Sea: is easily made tame, very good-natured, and sportive; but as unlucky as a monkey. It is almost always in motion; and very inquisitive, examining every thing with its paws. It makes use of them as hands; sits up to eat; is extremely fond of sweet things, and strong liquors, and will get excessively drunk. It has all the cunning of a fox; and is very destructive to poultry; but will eat all sorts of fruits, green corn, &c. At low water it feeds much on oysters, and will watch their opening, and with its paw snatch out the fish; it sometimes is caught in the shell, and kept there till drowned by the coming in of the tide: it is also fond of crabs. It climbs very nimbly up trees. It is hunted for its skin; the fur is next to that of the beaver for making hats.

5. The *meles*, or common badger, is an animal of a very clumsy make, with short thick legs, long claws on the fore feet, and a fetid white matter exuding from the orifice below the tail. It inhabits most parts of Europe, as far north as Norway and Russia, and the step or desert beyond Orenburgh, in the Russian Asiatic dominions, north of the Caspian Sea: inhabits also China, and is often found in the butchers shops in Pekin, the Chinese being fond of them; but a scarce animal in most countries. It seldom appears in the day; confines itself much to its hole; is indolent and sleepy; generally very fat; feeds by night; eats roots, fruits, grass, insects, and frogs; but is not carnivorous: it runs slowly; when overtaken, it comes to bay, and defends itself vigorously; its bite is dangerous. It burrows under ground; makes several apartments, but forms only one entrance from the surface. It is hunted during night for the skin, which serves for pistol furniture; the hairs for making brushes to soften the shades in painting. Its flesh makes good bacon.

URTICA, in botany: A genus of plants of the class of *monœcia*, and order of *tetrandria*; and in the natural system classed under the 53d order, *Scabideæ*. The small flower has a calyx of four leaves; no corolla; a nectarium minute, central, urn-fashioned. The female a bivalve calyx; and a

single, oval, glossy seed. There are 28 species; three of which are British plants.

1. The *pilulifera*, Roman nettle, has a stalk branched, two or three feet high. Leaves opposite, oval, serrated, stinging. Fruit globose.

2. The *urens*, less stinging nettle, has a stem a foot high. Leaves roundish, deeply serrated, opposite, burning. The stings are very curious microscopic objects: they consist of an exceedingly fine pointed, tapering, hollow substance, with a perforation at the point, and a bag at the base. When the spring is pressed upon, it readily perforates the skin, and at the same time forces up some of the acrimonious liquor contained in the bag into the wound.

3. The *dioica*, common nettle, has a square firm stem, three or four feet high. Leaves heart-shaped, long-pointed, serrated, beset with stings. Flowers in long catkins. The aculei, or stings of the nettle, have a small bladder at their base full of a burning corrosive liquor: when touched, they excite a blister, attended with a violent itching pain, though the sting does not appear to be tubular, or perforated at the top, nor any visible liquor to be infused into the puncture made by it in the flesh. It seems certain, however, that some of this liquor is insinuated into the wound, though invisibly, since the stings of the dried plant excite no pain.

Nettle-tops in the spring are often boiled and eaten by the common people instead of cabbage-greens.

In Arran, and other islands, a rennet is made of a strong decoction of nettles: a quart of salt is put to three pints of the decoction, and bottled up for use. A common spoonful of this liquor will coagulate a large bowl of milk very readily and agreeably. The stalks of nettles are so like in quality to hemp, that in some parts of Europe and Siberia they have been manufactured into cloth, and paper has been made of them. The whole plant, particularly the root, is esteemed to be diuretic, and has been recommended in the jaundice and nephritic complaints. It is also reckoned astringent; and of service in all kinds of hæmorrhagies, but is at present but little in practice. The roots boiled will dye yarn of a yellow colour. The larvæ, or caterpillars of many species of butterflies, feed on the green plant; and sheep and oxen will readily eat the dried.

URTICA-Marina. See ANIMAL-Flower.

USANCE, in commerce, is a determined time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called because regulated by the usage and custom of the places whereon they are drawn.

USE, in law, the profit or benefit of lands and tenements; or a trust and confidence reposed in a person for the holding of lands, &c. that he to whose use the trust is made shall receive the profits.

USHANT, an island of France, 15 miles west of the coast of Brittany, at the entrance of the British Channel.

USHER (James), archbishop of Armagh, one of the most illustrious prelates in the 17th century, as well with respect to his piety and other virtues, as his uncommon erudition, was born in Dublin in 1580, and it is said that two of his aunts taught him to read, though they were both born blind. Dublin college being finished in 1593, he was one of the three first students admitted into it. He made so swift a progress in his studies, that at 18 years of age he was able to dispute with Henry Fitz-Simon, a famous Jesuit, who challenged all the Protestant clergy; and defended his cause so well in the castle of Dublin, that he made him repent his challenge. He was ordained priest in 1601, and soon after was appointed to preach constantly before the court at Christ-church in Dublin, on Sundays in the afternoon. In 1603, he was sent over to England with Dr Luke Challoner,

Urtica
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Usher.

Usher,
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Challoner, in order to purchase books for the library of Dublin. In 1607, he took the degree of bachelor of divinity; soon after, he was made chancellor of St Patrick's cathedral, and the same year was chosen professor of divinity, when he made choice of Bellarmine's controversies for the subject of his lectures. Some years after, he made it a constant custom to come over to England once in three years, spending one month of the summer at Oxford, another at Cambridge, and the rest of the time at London. In 1612, he took the degree of doctor of divinity; at the latter end of the year 1620, he was promoted to the bishopric of Meath, and in 1625 was made archbishop of Armagh. In the administration of his archbishopric he acted in a very exemplary manner, and endeavoured to reform the clergy and officers in the ecclesiastical courts. In 1640, he came over to England with his family, with an intention soon to return to Ireland; but was prevented by the rebellion which broke out there in 1641; and in that rebellion he was plundered of every thing, except his library, which was in England, and some furniture in his house at Drogheda. His majesty, therefore, conferred on him the bishopric of Carlisle, to be held in *commendam*: the revenues of which were greatly lessened by the Scots and Irish armies quartering upon it; but when all the lands belonging to the bishoprics in England were seized by the parliament, they voted him a pension of 400 l. *per annum*, though he never received it above once or twice. He afterwards removed to Oxford; and, in 1643, was nominated one of the assembly of divines at Westminster, but refused to sit amongst them; which, together with some of his sermons at Oxford, giving offence to the parliament, they ordered his study of books, of considerable value, to be seized; but by the care of Dr Featly, one of the assembly, they were secured for the primate's use. The king's affairs declined; and Oxford being threatened with a siege, he left that city, and retired to Cardiff in Wales, to the house of Sir Timothy Tyrrel, who had married his only daughter, and was then governor and general of the ordnance. He was afterwards invited to London by the countess of Peterborough. In 1647, he was chosen preacher in Lincoln's-Inn; and during the treaty in the Isle of Wight, he was sent for by the king, who consulted him about the government of the church. The death of his majesty struck him with great horror. The countess of Peterborough's house, where the primate then lived, being just over against Charing Cross, several of her gentlemen and servants went up to the leads of the house, whence they could plainly see what was acting before Whitehall. As soon as his majesty came upon the scaffold, some of the household told the primate of it; and asked him, whether he would see the king once more before he was put to death. He was at first unwilling, but at last went up: where, as the ceremonial advanced, the primate grew more and more affected; and, when the executioners in vizards began to put up the king's hair, he swooned away. He died of a pleurisy in 1655; and was solemnly buried at Westminster, in St Erasmus's chapel. He published, 1. *Britannicarum Ecclesiarum Antiquitates*. 2. *Polycarpi et Ignatii Epistolæ, Græce Latine, &c.* 3. *Annals of the Old and New Testament, in Latin.* 4. *De Græce Septuaginta interpretum Versione Syntagma*; and many other books which are esteemed. A considerable number of his works still remain in manuscript.

USHER, an officer or servant who has the care and direction of the door of a court, hall, chamber, or the like.

USHER of the Black Rod, the eldest of the gentlemen ushers, daily waiters at court, whose duty is to bear the rod before the king at the feast of St George, and other solemnities.

USK, a river of Wales, which rises on the west of

Brecknockshire, and runs south-east through that county and Monmouthshire, falling into the mouth of the Severn.

USQUEBAUGH, a strong compound liquor, chiefly taken by way of dram.

There are several different methods of making this liquor; but the following is esteemed one of the best: To two gallons of brandy, or other spirits, put a pound of Spanish liquorice, half a pound of raisins of the sun, four ounces of currants, and three of sliced dates; the tops of baum, mint, savory, thyme, and the tops of the flowers of rosemary, of each two ounces; cinnamon and mace, well bruised, nutmegs, aniseeds, and coriander-seeds, bruised likewise, of each four ounces; of citron or lemon, and orange-peel, scraped, of each an ounce: let all these infuse 48 hours in a warm place, often shaking them together; then let them stand in a cool place for a week: after which the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white port, and a gallon of canary; after which it is to be sweetened with a sufficient quantity of double-refined sugar.

USTION, in pharmacy, the preparing of certain substances by burning them.

USUFRUIT, in the civil law, the use or enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating or changing the property thereof.

USURER, a person charged with a habit or act of usury.

USURIOUS CONTRACT, is any bargain or contract whereby a man is obliged to pay more interest for money than the statute allows.

USURPATION, in law, is an injurious using or enjoyment of a thing for continuance of time, that belongs of right to another.

USURY, an unlawful contract upon the loan of money, to receive the same again with exorbitant increase. Under the article INTEREST, it was observed, that by statute 37 Hen. VIII. c. 9. the rate of interest was fixed at 10 l. *per cent. per annum*: which the statute 13 Eliz. c. 8. confirms, and ordains, that all brokers shall be guilty of a *premunire* that transact any contracts for more, and the securities themselves shall be void. The statute 21 Jac. I. c. 17. reduced interest to 8 l. *per cent.*; and it having been lowered in 1650, during the usurpation, to 6 *per cent.* the same reduction was re-enacted after the Restoration by statute 12 Car. II. c. 13. and, lastly, the statute 12 Annæ, st. 2. c. 16. has reduced it to 5 *per cent.* Wherefore not only all contracts for taking more are in themselves totally void, but also the lender shall forfeit treble the money borrowed. Also if any scrivener or broker takes more than 5 s. *per cent.* procuration-money, or more than 12 d. for making a bond, he shall forfeit 20 l. with costs, and shall suffer imprisonment for half a year.

UTERUS, in anatomy. See there, n° 108.

UTICA (anc. geog.), a town of Africa Propria, on the Mediterranean: a Tyrian colony, and older than Carthage, (Sil. Italicus); its name, according to Bochart, denoting *old*: reckoned second to it; but after the destruction of Carthage, became the capital and centre of all the Roman transactions in Africa, according to Strabo; who adds, that it stood on the same bay with Carthage, at one of the promontories called *Apollonium*, bounding the bay on the west side, the other to the east called *Hermeia*, being at Carthage. It became famous by the death of Cato, who thence was called *Uticensis*.

UTRECHT, one of the seven United Provinces, or States of Holland, wholly surrounded by Holland and Guelderland, excepting a small part of it that borders on the Zuyder-

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Utrecht.

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Vultur.

Zuyder-Zee. Its greatest length is about 32 miles, and breadth about 22. It enjoys a good air; and in most places the soil is fruitful, but in some sandy, or what is called *turf-ground*, and in others over-run with wood. It is watered by the Leck, Rhine, Vecht, and other smaller rivers, besides several canals; of which that extending from the village of Vreeswyk to Utrecht is one of the chief.

UTRECHT, or, Latin, *Ultrajedum*, *Trajedum vetus* or *inferius*, or *Trajedum Rbeni*, capital of a province of the same name, so called from its ancient ferry or passage here over the Rhine; the word being compounded of *trecht*, which in Dutch signifies "a ferry," and *oud* or *olt*, i. e. "old." It is a fair, large, and populous city, situated 19 miles from Amsterdam, 25 from Rotterdam, and 27 from Leyden. Here is a stately town-house, with a commandery of the Teutonic order, and a celebrated university, which was founded in 1630, since which it hath flourished greatly, though it has not all the privileges of most other universities; being wholly subject to the magistrates of the city. The mall without the town, having five rows of lofty limes on each side, is very pleasant; and the physic-garden belonging to the university is extremely curious. There are five churches here that have chapters; but the members of these purchase the places, of which some cost 6000 or 7000 guilders. The streams which run through several of the streets, contribute much to the beauty and cleanliness of the town; and the canal that is cut from the Leck, and passes through it to Amsterdam, will carry ships of any burden. Pope Adrian VI. was a native of this city. Here, in 1579, the memorable union was formed between the seven provinces; and, in 1713, the celebrated peace concluded between France on the one part, and the allies on the other. The Papists have a nominal archbishop of this city; and there is a silk manufactory carried on in it, which employs a number of hands. The inhabitants are supposed to amount to 30,000. E. Long. 5. 8. N. Lat. 52. 7.

UTRICULARIA, in botany: A genus of plants of the class of *diandria*, and order of *monogynia*; and in the natural system arranged under the 24th order, *Corydales*. The calyx is ringent, with a nectarium resembling a spur; the corolla diphyllous and equal; the capsule unilocular. There are nine species; two of which are natives of Britain. They have been applied to no particular use.

UVA URSI. See **ARBUTUS**.

VULCAN, in Pagan worship, the god of subterraneous fire and metals, was the son of Jupiter and Juno; and was said to be so remarkably deformed, that his father threw him down from heaven to the isle of Lemnos, in which fall he broke his leg, and there he set up his forge, and taught men how to soften and polish brass and iron. Thence he removed to the Liparian isles, near Sicily, where, by the assistance of the Cyclops, he made Jupiter's thunderbolts, and armour for the other gods. Notwithstanding the deformity of his person, he had a passion for Minerva, and by Jupiter's consent made his addresses to her, but without success. He was, however, more fortunate in his suit to Venus; who, after her marriage, chose Mars for her gallant; when Vulcan exposed them to the ridicule of the other gods, by taking them in a net.

VULGATE, a very ancient Latin translation of the Bible, and the only one acknowledged by the church of Rome to be authentic. See **BIBLE**.

VULNERARY, in medicine, an epithet formerly given to remedies supposed to possess virtues for the cure of wounds and ulcers.

VULTUR, a genus of birds belonging to the order of *Accipitres*. The beak is straight and crooked at the point;

the head has no feathers; on the forepart being only naked skin; and the tongue is generally bifid. There are 21 species. The most remarkable are,

1. *Gryphus*, the condor, which is not only the largest of this genus, but perhaps of all others which are able to fly. The accounts of authors in regard to its extent of wing are various, viz. from 9 to 18 feet from the tip of one wing to that of the other. One gives it strength sufficient to carry off sheep, and boys of 10 years old; while another ventures to affirm, that it can lift an elephant from the ground high enough to kill it by the fall! M. de Salerne says, that one of this kind was shot in France in the year 1719, which weighed 18 lib. and whose extent of wing was 18 feet. But to come nearer the truth, perhaps it is better to abide by descriptions which bear a moderate proportion. In Hawkesworth's Voyages, mention is made of one of these birds shot at Port Desire, off Penguin Island, of which he gives the following description: "The head of this bird resembled that of an eagle, except that it had a large comb upon it. Round the neck it had a white ruff, exactly resembling a lady's tippet; the feathers on the back were as black as jet, and as bright as the finest polish could render that mineral; the legs were remarkably strong and large, and the talons like those of an eagle, except that they were not so sharp; and the wings, when they were extended, measured, from point to point, no less than 12 feet." This last account seems by no means to exceed the natural size, since we have an account in the Philosophical Transactions of one of the quill-feathers of this bird, brought from Chili, which measured 12 feet 4 inches; the diameter of the quill half an inch; and the extent of wing 16 feet. This bird was met in latitude 33 south, not far from the island Mocha, in the South Sea, in the year 1691. The seamen shot it on a cliff by the sea-side; and taking it for a kind of turkey, made a meal of it. In this account we are told that the colour was black and white, like a magpie, and the crest or comb sharp like a razor.

It seems now certain, that the account given by the editor of Cook's Voyage is very nearly, if not precisely, the truth, as two birds of this kind are now in the museum of Mr Parkinson, and are probably male and female. The first of these has an extent of wing somewhat under 11 feet. The bill is strong, moderately hooked, and blunt at the tip, which is white, the rest of it being of a dusky colour. On the top of the head runs a kind of carunculated substance, standing up like the comb of a cock. The head and neck are slightly covered with brown down, in some parts nearly bare, and here and there a carunculated part, as in the neck of a turkey. The lower part of the neck is surrounded with a ruff of a pure white and hairy kind of feathers. The upper parts of the body, wing, and gail, are black, except that the middle wing coverts have whitish ends, and the greater coverts half black half white. The nine or ten first quills are black, the rest white, with the tips only black; and when the wings are closed, producing the appearance of the bird having the back white; giving occasion to Molrué, in his History of Chili, to say, that the back was white. The under parts of the body are rather slightly covered with feathers; but those of the thighs are pretty long. The legs are stout and brown; claws black and blunt.

The second bird in Mr Parkinson's collection, chiefly differs from the first, in having not the least appearance of a comb or crest, but smooth for the most part, except where the head and neck are covered with down. The ruff on the lower part of the neck is not so full and conspicuous; but as to the colour of the plumage, the difference is not worth noticing. It is not impossible but this last may prove to be

Vultur.

Vultur.

a young male, for Molruc expressly says, that the female is smaller than the male, of a brown colour, and has no ruff about the neck, only a small tuft at the back part.

These birds are said to make the nest among the inaccessible rocks, and to lay two white eggs, larger than those of a turkey; are very destructive to sheep, and will in troops often attempt calves; in which case, some of them first pick out the eyes, whilst others attack the poor animal on all sides, and soon tear him to pieces. This gives rise to the following stratagem, used by the peasants of Chili: One of them wraps himself up in the hide of a fresh killed sheep or ox, and lies still on the ground; the condor, supposing it to be lawful prey, flies down to secure it, when the person concealed lays hold of the legs of the bird, his hands being well covered with gloves; and immediately his comrades, who are concealed at a distance, run in, and assist to secure the depredator, by falling on him with sticks till they have killed him. See Plate DX. fig. 4.

2. The *Pernopterus*, or Egyptian vultur. The appearance of this bird is as horrid as can well be imagined, viz. the face is naked and wrinkled; the eyes are large and black; the beak black and hooked; the talons large, and extending ready for prey; and the whole body polluted with filth: these are qualities enough to make the beholder shudder with horror. Notwithstanding this, the inhabitants of Egypt cannot be enough thankful to Providence for this bird. All the places round Cairo are filled with the dead bodies of asses and camels; and thousands of these birds fly about, and devour the carcases before they putrify and fill the air with noxious exhalations. The inhabitants of Egypt, and after them Maillet in his Description of Egypt, say, that they yearly follow the caravan to Mecca, and devour the filth of the slaughtered beasts, and the carcases of the camels which die on the journey. They do not fly high, nor are they afraid of men. If one is killed, all the rest surround him in the same manner as do the royston crows; they do not quit the places they frequent, though frightened by the explosion of a gun, but immediately return thither. Maillet imagines this bird to be the ibis of the ancients: but it is scarcely to be imagined, that a wise nation should pay such honours to an unclean, impure, and rapacious bird, which was not perhaps so common before the Egyptians filled the streets with carcases. If the ibis is to be found, it must certainly be looked for in the order of grallæ of Linnæus; and we imagine it to be the white stork (*Ardea ciconia*), which is so common in Egypt. The Arabians call it *rochame*; the French living in Egypt, give it the name of *chapon de Pharaon*, or *de Mahometh*.

3. The *aura*, or carrion vulture, according to Mr Latham, is about the size of a turkey, though it varies in size in different parts. The bill is white; the end black; irides bluish saffron-colour. The head, and part of the neck, are bare of feathers; and of a red, or rather rufous colour. The sides of the head warted, not unlike that of a turkey. The whole plumage is brown black, with a purple and green gloss in different reflections; but in some birds, especially young ones, greatly verging to dirty brown. The feathers of the quills and tail are blacker than the rest of the body. The legs are flesh-colour; the claws black.

This bird is very common in the West Indies, and both in North and South America. It feeds on dead carcases, snakes, &c. like most of this genus; which makes the smell of it very offensive. In general, it is very tame in its wild state, but particularly so when trained up from being young. This our author experienced in two birds sent home from Jamaica. They were suffered to run wild about the garden, and were alert and brisk during the summer months; but impatient of the least cold; for a rainy day, with the

slightest degree of cold, obliged them to creep for shelter. In the West Indies, they roost together of nights, in vast numbers, like rooks in this country. They are reckoned a most useful animal in the places where they resort; which secures their safety, added to a penalty for killing one, which is in force in Jamaica, and other islands of the West Indies.

4. The *sagittarius*, or secretary, is a most singular species, being particularly remarkable from the great length of its legs; which at first sight would induce one to think it belonged to waders: but the characters of the vultur are so strongly marked throughout, as to leave no doubt to which class it belongs.

The bird, when standing erect, is full three feet from the top of the head to the ground. The bill is black, sharp, and crooked, like that of an eagle; the head, neck, breast, and upper parts of the body, are of a bluish ash colour: the legs are very long, stouter than those of a heron, and of a brown colour; claws shortish, but crooked, not very sharp, and of a black colour; from the hind-head springs a number of long feathers, which hang loose behind like a pendent crest; these feathers arise by pairs, and are longer as they are lower down on the neck; this crest the bird can erect or depress at pleasure; it is of a dark colour, almost black; the webs are equal on both sides, and rather curled; and the feathers, when erected, somewhat incline towards the neck; the two middle feathers of the tail twice as long as any of the rest.

This singular species inhabits the internal parts of Africa, and is frequently seen at the Cape of Good Hope. It is also met with in the Philippine islands.

The description was taken by Mr Latham from three that were alike, which he saw in England alive some years since; two of which are now in the Leverian museum. From confinement they had lost their two long tail feathers; but this want was supplied by some accurate drawings by Sir Joseph Banks, taken from the life at the Cape.

As to the manners of this bird, it is on all hands allowed that it principally feeds on rats, lizards, snakes, and the like; and that it will become familiar: whence Sonnerat is of opinion, that it might be made useful in some of our colonies, if encouraged, towards the destruction of those pests. They call it at the Cape of Good Hope *slangeater*, i. e. snake eater. A great peculiarity belongs to it, perhaps observed in no other; which is, the faculty of striking forwards with its legs, never backwards. Dr Solander has seen one of these birds take up a snake, small tortoise, or such like, in its claws; when dashing it from thence against the ground with great violence, if the victim was not killed at first, it repeated the operation till that end was answered; after which it ate it up quietly. Dr J. R. Forster mentioned a further circumstance, which he says was supposed to be peculiar to this bird; that should it by any accident break the leg, the bone would never unite again.

VULVA, in anatomy. See there, n° 132.

UVULA, in anatomy. See there, n° 102.

UZ, or Urz, the country and place of residence of Job. In the genealogy of the patriarchs there are three persons called Uz, either of which might give this district its name. The first was the grandson of Sem, by his son Aram (Gen. xxii. 23.), who, according to Josephus, occupied the Trachonitis, and Damascus, to the north of Palestine: but Job was among the sons of the East. Another Uz was the son of Nahor, Abraham's brother (Gen. x. 21.), who appears to have removed, after passing the Euphrates, from Haran of Mesopotamia to Arabia Deserta. The third Uz was a Horite, from mount Seir (Gen. xxxvi. 28.), and thus not of Eber's posterity. Now the question is, from which of these Job's

Vultur
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Uz.

Uz. Job's country, Uz, took its name? Not from the first, as is already shown; nor from the second, because his country is always called *Scir*, or *Edom*, never *Uz*; and then called a *south*, not an *east*, country, in Scripture. It therefore remains, that we look for the country and place of residence of Job in Arabia Deserta; for which there was very pro-

bable reasons. The plunderers of Job are called *Chaldeans* and *Sabeans*, next neighbours to him. These Sabceans came not from Arabia Felix, but from a nearer Sabe in Arabia Deserta (Ptolemy); and his friends, except Eliphaz the Themanite, were of Arabia Deserta.

UZBECK TARTARY. See TARTARY,

Uz.
Uzbek.

W.

Waag
Waggon.

W, or *w*, is the 21st letter of our alphabet; and is composed, as its name implies, of two *v*'s. It was not in use among the Hebrews, Greeks, or Romans; but chiefly peculiar to the northern nations, the Teutones, Saxons, Britons, &c. But still it is not used by the French, Italians, Spaniards, or Portuguese, except in proper names, and other terms borrowed from languages in which it is originally used, and even then it is sounded like the single *v*. This letter is of an ambiguous nature; being a consonant at the beginning of words, and a vowel at the end. It may stand before all the vowels except *u*; as *water*, *wedge*, *winter*, *wonder*: it may also follow the vowels *a*, *e*, *o*, and unites with them into a kind of double vowel, or diphthong; as in *saw*, *few*, *cow*, &c. It also goes before *r*, and follows *f* and *th*; as in *wrath*, *swear*, *thwart*: it goes before *h* also, though in reality it is sounded after it; as in *when*, *what*, &c. In some words it is obscure, as in *shadow*, *widow*, &c.

WAAG, a river of Hungary, which rises in the Carpathian mountains, and falls into the Danube opposite to the island of Schut.

WAAL, a river of the United Netherlands, being one of the branches of the Rhine, which runs from east to west, thro' Guelderland, passing by Nimeguen, Tiel, Bommel, and Gorcum; and, uniting with the Maes, falls into the German Sea below the Briel.

WACHENDORFIA, in botany: A genus of plants of the class of *triandria*, and order of *monogynia*; and arranged in Linnæus's Natural Method of Classification under the 6th order, *Infata*. The corolla is hexapetalous, unequal, and situated below the germen; the capsule trilocular and superior. There are four species; none of which are natives of Britain.

WADD, or **WADDING**, is a stopple of paper, hay, straw, or the like, forced into a gun upon the powder, to keep it close in the chamber; or to put up close to the shot, to keep it from rolling out.

WADSET, in Scots law. See **LAW**, n° clxix. 1.

WAFERS, or *Sealing Wafers*, are made thus: Take very fine flour, mix it with glair of eggs, isinglass, and a little yeast; mingle the materials; beat them well together; spread the batter, being made thin with gum-water, on even tin plates, and dry them in a stove; then cut them out for use.

You may make them of what colour you please, by tinging the paste with brasil or vermilion for red; indigo or verditer, &c. for blue; saffron, turmeric, or gamboge, &c. for bellow.

WAGER of LAW. See (*Wager of*) **LAW**.

WAGER of Battel. See (*Wager of*) **BATTEL**.

WAGGON, a wheel-carriage, of which there are various forms, accommodated to the different uses they are intended for. The common waggon consists of the shafts or

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rods, being the two pieces which the hind horse bears up; the welds; the flotes, or cross pieces, which hold the shafts together; the bolster, being that part on which the forewheels and the axle-tree turn in wheeling the waggon across the road; the chest or body of the waggon, having the flaves or rails fixed thereon; the bales, or hoops which compose the top; the tilt, the place covered with cloth, at the end of the waggon. See **MECHANICS**, Sect. iv.

WAGTAIL, in ornithology. See **MOTACILLA**.

WAIFS, *BONA WAVIATA*, are goods stolen, and waived or thrown away by the thief in his flight, for fear of being apprehended. These are given to the king by the law, as a punishment upon the owner for not himself pursuing the felon, and taking away his goods from him. And therefore if the party robbed do his diligence immediately to follow and apprehend the thief (which is called *making fresh suit*), or do convict him afterwards, or procure evidence to convict him, he shall have his goods again. Waived goods do also not belong to the king till seized by somebody for his use; for if the party robbed can seize them first, though at the distance of 20 years, the king shall never have them. If the goods are hid by the thief, or left anywhere by him, so that he had them not about him when he fled, and therefore did not throw them away in his flight; these also are not *bona waviata*, but the owner may have them again when he pleases. The goods of a foreign merchant, though stolen and thrown away in flight, shall never be waifs: the reason whereof may be, not only for the encouragement of trade, but also because there is no wilful default in the foreign merchant's not pursuing the thief, he being generally a stranger to our laws, our usages, and our language.

WAIGATS STRAITS, situated between Nova Zembla and Russia, through which the Dutch sailed to the north, as high as 75°, in order to discover a north-east passage to China and the East Indies.

WAINSCOT, in building, the timber-work that serves to line the walls of a room, being usually made in pannels, and painted, to serve instead of hangings.

WAIVE, in law, a woman that is put out of the protection of the law. She is called *waive*, as being forsaken of the law; and not *outlaw* as a man is; by reason women cannot be of the decenna, and are not sworn in leets to the king, nor to the law, as men are; who are therefore within the law; whereas women are not, and so cannot be outlawed, since they never were within it.

WAKE, the print or track impressed by the course of a ship on the surface of the water. It is formed by the reunion of the body of water which was separated by the ship's bottom whilst moving through it; and may be seen to a considerable distance behind the stern, as smoother than the rest of the sea. Hence it is usually observed by the compass, to discover the angle of lee-way.

Wagtail
Wake.

Wake.

A ship is said to be in the wake of another when she follows her on the same track, or a line supposed to be formed on the continuation of her keel.

Two distant objects observed at sea are called in the wake of each other, when the view of the farthest is intercepted by the nearest; so that the observer's eye and the two objects are all placed upon the same right line.

WAKE is the eve-feast of the dedication of churches, which is kept with feasting and rural diversions.

The learned Mr Whitaker, in his History of Manchester, hath given a particular account of the origin of wakes and fairs. He observes, that every church at its consecration received the name of some particular saint: this custom was practised among the Roman Britons, and continued among the Saxons; and in the council of Cealchythe, in 816, the name of the denominating saint was expressly required to be inscribed on the altars, and also on the walls of the church, or a tablet within it. The feast of this saint became of course the festival of the church. Thus Christian festivals were substituted in the room of the idolatrous anniversaries of heathenism: accordingly, at the first introduction of Christianity among the Jutes of Kent, pope Gregory the Great advised what had been previously done among the Britons, viz. Christian festivals to be instituted in the room of the idolatrous, and the suffering day of the martyr whose relics were repositied in the church, or the day on which the building was actually dedicated, to be the established feast of the parish. Both were appointed and observed; and they were clearly distinguished at first among the Saxons, as appears from the laws of the Confessor, where the *dies dedicationis*, or *dedicatio*, is repeatedly discriminated from the *propria festivitas sancti*, or *celebratio sancti*. They remained equally distinct to the Reformation; the dedication-day in 1536 being ordered for the future to be kept on the first Sunday in October, and the festival of the patron saint to be celebrated no longer. The latter was, by way of pre-eminence, denominated the *church's holiday*, or its peculiar festival; and while this remains in many parishes at present, the other is so utterly annihilated in all, that bishop Kennet (says Mr Whitaker) knew nothing of its distinct existence, and has attributed to the day of dedication what is true only concerning the saint's day. Thus instituted at first, the day of the tutelar saint was observed, most probably by the Britons, and certainly by the Saxons, with great devotion. And the evening before every saint's day, in the Saxon Jewish method of reckoning the hours, being an actual hour of the day, and therefore like that appropriated to the duties of public religion, as they reckoned Sunday from the first to commence at the sun-set of Saturday; the evening preceding the church's holiday would be observed with all the devotion of the festival. The people actually repaired to the church, and joined in the services of it; and they thus spent the evening of their greater festivities in the monasteries of the North, as early as the conclusion of the seventh century.

These services were naturally denominated from their late hours *wæccan* or *wakes*, and *vigils* or *eves*. That of the anniversary at Rippon, as early as the commencement of the eighth century, is expressly denominated the *vigil*. But that of the church's holiday was named *cyric wæccan*, or church-wake, the church-vigil, or church eve. And it was this commencement of both with a wake, which has now caused the days to be generally preceded with vigils, and the church-holiday particularly to be denominated the *church-wake*. So religiously was the eve and festival of the patron saint observed for many ages by the Saxons, even as late as the reign of Edgar, the former being spent in the

church, and employed in prayer. And the wakes, and all the other holidays in the year, were put upon the same footing with the octaves of Christmas, Easter, and of Pentecost. When Gregory recommended the festival of the patron saint, he advised the people to erect booths of branches about the church on the day of the festival, and to feast and be merry in them with innocence. Accordingly, in every parish, on the returning anniversary of the saint, little pavilions were constructed of boughs, and the people indulged in them to hospitality and mirth. The feasting of the saint's day, however, was soon abused; and even in the body of the church, when the people were assembled for devotion, they began to mind diversions, and to introduce drinking. The growing intemperance gradually stained the service of the vigil, till the festivity of it was converted, as it now is, into the rigour of a fast. At length they too justly scandalized the Puritans of the last century, and numbers of the wakes were disused entirely, especially in the east and some western parts of England; but they are commonly observed in the north, and in the midland counties.

This custom of celebrity in the neighbourhood of the church, on the days of particular saints, was introduced into England from the continent, and must have been familiar equally to the Britons and Saxons; being observed among the churches of Asia in the sixth century, and by those of the west of Europe in the seventh. And equally in Asia and Europe on the continent, and in the islands, these celebrities were the causes of those commercial marts which we denominate *fairs*. The people resorted in crowds to the festival, and a considerable provision would be wanted for their entertainment. The prospect of interest invited the little traders of the country to come and offer their wares; and thus, among the many pavilions for hospitality in the neighbourhood of the church, various booths were erected for the sale of different commodities. In larger towns, surrounded with populous districts, the resort of the people to the wakes would be great, and the attendance of traders numerous; and this resort and attendance constitute a fair.—Basil expressly mentions the numerous appearance of traders at these festivals in Asia, and Gregory notes the same custom to be common in Europe. And as the festival was observed on a feria or holiday, it naturally assumed to itself, and as naturally communicated to the mart, the appellation of *feria* or fair. Indeed several of our most ancient fairs appear to have been usually held, and have been continued to our time, on the original church-holidays of the places: besides, it is observable, that fairs were generally kept in church-yards, and even in the churches, and also on Sundays, till the indecency and scandal were so great as to need reformation.

Wake-Robin. See ARUM.

WALACHIA, a province of Turkey in Europe, bounded on the north by Moldavia and Transylvania, on the east and south by the river Danube, and on the west by Transylvania. It is 225 miles in length, and 125 in breadth; and was ceded to the Turks by the treaty of Belgrade, in 1739. It abounds in good horses and cattle; and there are mines of several kinds. The soil is so fertile, that it is capable of producing any thing; and there are good pastures, with wine, oil, and all manner of European fruits. The inhabitants are chiefly of the Greek church.

WALCHEREN, an island of the Low Countries, and one of the principal of those of Zealand; separated from Dutch Flanders by the mouth of the Scheld. It is about nine miles in length, and eight in breadth; and though it lies low, has good arable and pasture land. The chief town of this island and the whole province is Middleburg.

WALDEN,

Wake

Walcheren.

Walden
||
Wales.

WALDEN, a town of Essex, commonly called *Saffron Walden*, with a market on Saturdays, and two fairs on Mid-lent Saturday for horses, and November 1st for cows. It is remarkable for the plenty of saffron that grows about it. This town was incorporated by Edward VI. and is governed by a mayor and 24 aldermen. It is 27 miles north-west-by-north of Chelmsford, and 43 north-east of London. E. Long. 0. 20. N. Lat. 52. 4.

WALDENSES. See **WALDO**.

WALDO, a merchant of Lyons in the latter part of the 12th century, who applying himself to the study of the Scriptures, and finding no warrant there for several of the Romish doctrines, particularly that of transubstantiation, publicly opposed them. His followers, who from him were called *Waldenses*, being chased from Lyons, spread over Dauphine and Provence; upon which Philip II. is said to have razed 300 gentlemen's seats, and destroyed several walled towns to stop their growth: but this, instead of suppressing, spread them over a great part of Europe. The articles of their faith, which they drew up and dedicated to the king of France, agreed in most points with those of the present Protestants. In the year 1200, those of them who dwelt in the province of Albigeois in Languedoc, from whence they were called *Albigenses*, stood upon their defence; upon which Philip drove them into Bohemia, Savoy, and England. The crusade against them is said to have consisted of 500,000 men, who wore their crosses on their breasts, to distinguish themselves from those who went to the Holy Land, and wore them on their shoulders.

WALES, a county situated in the south-west part of Britain, into which the ancient Britons retired from the persecution of the Saxons. Anciently it was of greater extent than it is at present, and comprehended all the country beyond the Severn, that is, besides the 12 counties included in it at present, those of Herefordshire and Monmouthshire, which now are reckoned a part of England, were then inhabited by three different tribes of the Britons, namely, the Silures, the Dimetæ, and the Ordovices. The Romans were never able to subdue them, till the reign of Vespasian, when they were reduced by Julius Frontinus, who placed garrisons in their country to keep them in awe. Though the Saxons made themselves masters of all England, they never could get possession of Wales, except the counties of Monmouthshire and Herefordshire, formerly a part of Wales. About the year 870, Roderic king of Wales divided it among his three sons; and the names of these divisions were, *Demetia*, or *South-Wales*; *Powesia*, or *Powis-Land*; and *Venedotia*, or *North-Wales*. Another division is mentioned afterwards in the records, viz. North Wales, South Wales, and West Wales; the last comprehending the counties of Monmouth and Hereford. The country derived the name of *Wales*, and the inhabitants that of *Welsh*, from the Saxons, who by those terms denote a country and people to which they are strangers; for the Welsh, in their own language, call their country *Cymry*, and their language *Cymraeg*. They continued under their own princes and laws from the above-mentioned period, and were never entirely subjected to the crown of England till the reign of Edward I. when Llewellyn ap Gryffith, prince of Wales, lost both his life and dominions. Edward, the better to secure his conquest, and to reconcile the Welsh to a foreign yoke, sent his queen to lie in at Caernarvon, where she was delivered of a prince; to whom the Welsh, on that account, the more readily submitted. Ever since that time, the eldest sons of the kings of England have commonly been created princes of Wales, and as such enjoy certain revenues from that country.

As to the character of the Welsh, they are said to be

a brave, hospitable people; and though very jealous of affronts, passionate, and hasty, yet are easily reconciled. The common people look with a suspicious eye on strangers, and bear an hereditary grudge to the English nation, by whom their ancestors were expelled from the finest parts of the island. The gentlemen are apt to value themselves upon the antiquity of their families; and with some reason, as they can generally trace them much higher than the inhabitants of most other countries.

All the better sort, both in town and country, can speak English, especially in the counties bordering upon England. The common people, in general, only speak their own language, which is the ancient British; and not only differs entirely from the English, but has very little affinity with any of the western tongues, unless we should accept the Gaelic, Erse, or Irish. It is said to be a dialect of the ancient Celtic, and in many respects to resemble the Hebrew. Most of the clergy are natives of the country, and understand English so well, that they could exercise their functions in any part of Britain. The public worship, however, is as often performed in Welsh as in English, excepting in the towns, where the latter is the prevailing language. The inhabitants are computed at about 300,000.

The country, though mountainous, especially in North Wales, is far from being barren or unfruitful; the hills, besides the metals and minerals they contain, feeding vast herds of small black cattle, deer, sheep, and goats, and their valleys abounding in corn, as their seas and rivers do in fish. Here are also wood, coal, and turf for fuel, in abundance.

Wales is bounded on all sides by the sea and the Severn; except on the east, where it joins to the counties of Chester, Salop, Hereford, and Monmouth. Its length, from the southernmost part of Glamorganshire to the extremity of Flintshire north, is computed at about 113 miles; and its greatest breadth, from the river Way east to St David's in Pembrokeshire west, is nearly of the same dimensions, being about 90 miles.

After the conquest of Wales by Edward I. very material alterations were made in their laws, so as to reduce them nearer to the English standard, especially in the forms of their judicial proceedings: but they still retained very much of their original polity, particularly their rule of inheritance, viz. that their lands were divided equally among all the issue male, and did not descend to the eldest son alone. By other subsequent statutes their provincial immunities were still farther abridged: but the finishing stroke to their dependency was given by the statute 27 Hen. VIII. c. 26. which at the same time gave the utmost advancement to their civil prosperity, by admitting them to a thorough communication of laws with the subjects of England.—Thus were this brave people gradually conquered into the enjoyment of true liberty; being insensibly put upon the same footing, and made fellow-citizens, with their conquerors.

It is enacted by the 27 Hen. VIII. 1. That the dominion of Wales shall be for ever united to the kingdom of England. 2. That all Welshmen born shall have the same liberties as other king's subjects. 3. That lands in Wales shall be inheritable according to the English tenures and rules of descent. 4. That the laws of England, and no other, shall be used in Wales: besides many other regulations of the police of this principality. And the 34 and 35 Hen. VIII. c. 26. confirms the same, adds farther regulations, divides it into twelve shires, and, in short, reduces it into the same order in which it stands at this day; differing from the kingdom of England in only a few particulars, and those too of the nature of privileges (such as having courts within itself, independent of the process of Westminster-

Wales.

Wales
Waller.

minstar-hall), and some other immaterial peculiarities, hardly more than are to be found in many counties of England itself.

New WALES. See *NEW BRITAIN*.

New South-WALES. See *NEW HOLLAND*.

Prince of WALES. See *ROYAL FAMILY*.

WALKING Leaf. See *MANTIS Sycifolia*.

WALL, in architecture, the principal part of a building, as serving both to inclose it, and to support the roof, floors, &c.—Walls are distinguished into various kinds, from the matter whereof they consist; as plastered or mud-walls, brick-walls, stone-walls, flint or boulder-walls, and boarded-walls. See *ARCHITECTURE*.

Cob or Mud WALL. In those parts of England where stone is scarce, it is usual to make walls and houses of mud, or, as it is called in Devonshire, *cob*; which is a composition of earth and straw, wet up somewhat like mortar, but well beat and trod together. When a wall is making, after being raised to a certain height, it is allowed time to pitch or settle before the work is resumed. Some value themselves on their skill in building with this composition; the price, when materials are found, is generally in Devonshire 3s. per perch of 16½ feet; but a stone foundation costs more. Houses built with this, being covered with thatch, are very dry and warm; a cob-wall, if in a good situation, will last 50 or 60 years or more. When pulled down, they are used as manure, and new earth employed to rebuild with.

WALLACE (Sir William), a gallant general of the Scots, who endeavoured to rescue his country from the English yoke; but being taken prisoner, he was unjustly tried by the English laws, condemned, and executed as a traitor to Edward I. in 1304. See *SCOTLAND*, n° 103, *et seq.*

WALLACHIA. See *WALACHIA*.

WALLER (Edmund), a celebrated English poet, was the son of Robert Waller, Esq; of Agmondesham in Buckinghamshire, by Anne, the sister of the great Hamden, who distinguished himself so much in the beginning of the civil wars. He was born in 1605; and his father dying when he was very young, the care of his education fell to his mother, who sent him to Eton school. He was afterwards sent to King's college in Cambridge, where he must have been very assiduous in his studies, since, at sixteen or seventeen years of age, he was chosen into the last parliament of King James I. and served as burgess for Agmondesham. He began to exercise his poetical talent so early as the year 1623; as appears from his verses "upon the danger his majesty (being prince) escaped in the road of St Andero;" for there Prince Charles, returning from Spain that year, had like to have been cast away. It was not, however, Mr Waller's wit, his fine parts, or his poetry, that so much occasioned him to be first publicly known, as his carrying off the daughter and sole heiress of a rich citizen, against a rival whose interest was espoused by the court. It is not known at what time he married his first lady; but he was a widower before he was 25, when he began to have a passion for Sacharissa, which was a fictitious name for the lady Dorothy Sidney, daughter to the earl of Leicester, and afterwards wife to the earl of Sunderland. He was now known at court, caressed by all who had any relish for wit and polite literature; and was one of the famous club of which Lord Falkland, Mr Chillingworth, and other eminent men, were members. He was returned burgess for Agmondesham in the parliament which met in April 1640. An intermission of parliaments having disgusted the nation, and raised jealousies against the designs of the court, which would be sure to discover themselves whenever the king came to ask for a supply, Mr Waller was one of the first

who condemned the preceding measures. He showed himself in opposition to the court, and made a speech in the house on this occasion; from which we may gather some notion of his general principles in government; wherein, however, he afterwards proved very variable and inconstant. He opposed the court also in the long parliament which met in November following, and was chosen to impeach Judge Crawley, which he did in a warm and eloquent speech, July 16th 1641. This speech was so highly applauded, that 20,000 copies of it were sold in one day. In 1642, he was one of the commissioners appointed by the parliament to present their propositions of peace to the king at Oxford. In 1643, he was deeply engaged in a design to reduce the city of London and the tower to the service of the king; for which he was tried and condemned, together with Mr Tomkins his brother-in-law, and Mr Challoner. The two latter suffered death; but Mr Waller obtained a reprieve: he was, however, sentenced to suffer a year's imprisonment, and to pay a fine of 10,000 l. After this, he became particularly attached to Oliver Cromwell, upon whom he wrote a very handsome panegyric. He also wrote a noble poem on the death of that great man.

At the Restoration, he was treated with great civility by Charles II. who always made him one of the party in his diversions at the duke of Buckingham's and other places. He wrote a panegyric upon his majesty's return; which being thought to fall much short of that he had before written on Oliver Cromwell, the king one day asked him in raillery, "How is it, Waller, that you wrote a better encomium on Cromwell than on me?" "May it please your majesty," answered he, "we poets generally succeed best in fiction." He sat in several parliaments after the Restoration, and continued in the full vigour of his genius to the end of his life, his natural vivacity bearing him up, and making his company agreeable to the last. He died of a dropsy in 1687, and was interred in the church-yard of Beaconsfield, where a monument is erected to his memory. Mr Waller has been honoured as the most elegant and harmonious versifier of his time, and a great refiner of the English language. The best edition of his works, containing poems, speeches, letters, &c. is that published in quarto by Mr Fenton, in 1730.

WALLIS (Dr John), a celebrated mathematician, was educated at Cambridge; where he became fellow of Queen's college, and continued so till, by his marriage, he vacated his fellowship. In 1640, he received holy orders, and became chaplain to the lady Vere. While he lived in this family, he cultivated the art of deciphering; and it is said, that the elector of Brandenburg, for whom he explained several letters written in ciphers, sent him a gold chain and medal. In 1643 he published, "Truth tried; or, Animadversions on the lord Brooke's treatise, called *The Nature of Truth*, &c". The next year he was chosen one of the scribes or secretaries to the assembly of divines at Westminster. Dr Peter Turner, Savilian professor of geometry in Oxford, being ejected by the parliament-visitors in 1649, Mr Wallis was appointed to succeed him in that place. In 1653 he published at Oxford a Grammar of the English Tongue in Latin. In 1655 he entered the lists with Mr Hobbes; and their controversy lasted a considerable time. In 1657 the Doctor published his *Mathematical Works*. Upon the death of Dr Langbaine, he was chosen custos archivorum of the university. After the Restoration he met with great respect, the king himself entertaining a favourable opinion of him on account of some services he had done both to his royal father and himself. He was therefore confirmed in his places, admitted one of the king's chaplains in ordinary, and appointed one of the divines empowered to review the book

Waller,
Wallis.

Walloons
Walpole.

book of common prayer. He complied with the terms of the act of uniformity, and continued a steady conformist till his death. He was one of the first members of the Royal Society, and corresponded with many learned men. In 1697, the curators of the university press at Oxford thought it for the honour of the university to collect the mathematical works of the Doctor, which had been printed separately, some in Latin, some in English, and published them all together in the Latin tongue, in 3 vols, folio. He died in 1703. He speaks of himself thus: "It hath been my endeavour all along to act by moderate principles, being willing, whatever side was uppermost, to promote any good design for the true interest of religion, of learning, and of the public good." Besides the works above-mentioned, he published many others.

WALLOONS, a name for the inhabitants of a considerable part of the Netherlands, viz. Artois, Hainault, Namur, Luxemburg, and part of Flanders and Brabant.

WALNUT-TREE, in botany. See JUGLANS.

WALPOLE (Sir Robert), earl of Orford, was born at Houghton in Norfolk, September 6th, 1674, and educated on the foundation at Eton school. Thence he was elected to King's College in Cambridge; but, succeeding to the family estate by the death of his elder brother, he resigned his fellowship. In 1700, he was chosen member of parliament for King's Lynn, and represented that borough in several succeeding parliaments. In 1705, he was nominated one of the council to prince George of Denmark, lord high admiral of England; in 1707, appointed secretary at war; and, in 1709, treasurer of the navy. In 1710, upon the change of the ministry, he was removed from all his posts, and held no place afterwards during the queen's reign. In 1711 he was expelled from the house of commons for what they called notorious corruption in his office as secretary at war. The borough of Lynn, however, re-elected him; and, though the house declared the election void, yet they persisted in the choice. In the well-known debate relating to Steele for publishing the Crisis, he greatly distinguished himself in behalf of liberty, and added to the popularity he had before acquired.

On the death of the queen, a revolution of politics took place, and the Whig party prevailed both at court and in the senate. Walpole had before recommended himself to the house of Hanover by his zeal for its cause, when the commons considered the state of the nation with regard to the Protestant succession: and he had now the honour to procure the assurance of the house to the new king (which attended the address of condolence and congratulation), "That the commons would make good all parliamentary funds." It is therefore not to be wondered at, that his promotion soon took place after the king's arrival; and that in a few days he was appointed receiver and paymaster general of all the guards and garrisons, and of all other the land forces in Great Britain, paymaster of the royal hospital at Chelsea, and likewise a privy counsellor. On the opening of a new parliament, a committee of secrecy was chosen to enquire into the conduct of the late ministry, of which Walpole was appointed chairman; and, by his management, articles of impeachment were read against the earl of Oxford, lord Bolingbroke, the duke of Ormond, and the earl of Strafford. The eminent service he was thought to have done the crown, by the vigorous prosecution of those ministers who were deemed the chief instruments of the peace, was soon rewarded by the extraordinary promotions to the offices of first commissioner of the treasury, and chancellor and under treasurer of the exchequer.

In two years time he resigned all his offices on account of a misunderstanding which took place between him and the rest of the ministry about certain supplies demanded for the support of his majesty's German dominions. On the day of his resignation he brought in the famous sinking fund-bill, which he presented as a country gentleman, saying, that he hoped it would not fare the worse for having two fathers; and that his successor Mr Stanhope would bring it to perfection. His calling himself the father of a project, which hath since been so often employed to other purposes than were at first declared, gave his enemies frequent opportunity for satire and ridicule; and it hath been sarcastically observed, that the father of this fund appeared in a very bad light when viewed in the capacity of a nurse. In the next session of parliament, Walpole opposed the ministry in every thing; and even Wyndham or Shippen did not exceed him in patriotism. Upon a motion in the house for continuing the army, he made a speech of above an hour long, and displayed the danger of a standing army in a free country, with all the powers of eloquence. Early in 1720 the rigour of the patriot began to soften, and the complaisance of the courtier to appear; and he was again appointed paymaster of the forces, and several of his friends were found soon after in the list of promotions. No doubt now remained of his entire conversion to court measures; for, before the end of the year, we find him pleading as strongly for the forces required by the war-office as he had before declaimed against them, even though at this time the same pretences for keeping them on foot did not exist.

It was not long before he acquired full ministerial power, being appointed first lord commissioner of the treasury, and chancellor of the exchequer; and, when the king went abroad in 1723, he was nominated one of the lords justices for the administration of government, and was sworn sole secretary of state. About this time he received another distinguished mark of the royal favour; his eldest son then on his travels being created a peer, by the title of baron Walpole of Walpole. In 1725 he was made knight of the Bath, and the year after knight of the Garter. The measures of his administration, during the long time he remained prime or rather sole minister, have been often canvassed with all the severity of critical inquiry. It is difficult to discern the truth through the exaggerations and misrepresentations of party. He has indeed been accused of employing the sinking fund for the purposes of corruption, of which it was long the fashion to call him the father; but the man who reflects on the transactions of Charles II. and his infamous cabal, will acquit him of the latter part of this charge. He was an enemy to war, and the friend of commerce; and because he did not resent some petty insults of the court of Spain so suddenly as the fiery part of the nation thought he should have done, a formidable opposition was formed against him in the house, which had influence enough to employ in its cause almost all the wit of the nation. Pulteney and Pitt were the great leaders of the party in the house of commons; while Bolingbroke and Pope and Johnson, and almost every man of genius, exerted themselves without doors to enlighten, by pamphlets in prose and verse, the minds of the people, and show the necessity of a Spanish war. This he strenuously opposed, because he knew that the foreign settlements of that power are very remote, and in a climate destructive to Englishmen; and that such of them as we might be able to take, we could not possibly retain. The opposition however prevailed. The nation was indulged in a war, of which it surely had no cause to boast of the success; and it is now universally known, that the greater part of those who with honest intentions had, either in parliament or out of it, been engaged

Walpole. engaged to run down the minister, lived to repent of their conduct, and do justice to the man whom they had so pertinaciously vilified.

In order to encourage commerce and improve the revenue, Sir Robert projected a scheme for an extension of the excise, as the only means of putting a stop to the frauds of merchants and illicit traders. This was another ground of clamour to the orators within, and the wits without, doors; and while the opposition represented it as a measure big with public mischief, Swift and Pope occasionally alluded to it as an oppression calculated to deprive private life of all its comforts. The minister was therefore obliged to abandon the scheme; but in a succeeding administration it was partly carried into execution, at the express solicitation of the principal persons concerned in that article of trade which it was suggested would be most affected by it; and afterwards the most popular minister that ever directed the councils of this country declared in full senate, that if a time should ever arrive which was likely to render the project feasible, he would himself recommend an extension of the excise laws as a measure of the greatest advantage to commerce, to the revenue, and to the general interests of the kingdom.

In 1742 the opposition prevailed; and Sir Robert being no longer able to carry a majority in the house of commons, resigned all his places, and fled for shelter behind the throne. He was soon afterwards created earl of Orford; and the king, in consideration of his long and faithful services, granted him a pension of 4000 l. *per annum*. The remainder of his life he spent in tranquillity and retirement, and died, 1745, in the 71st year of his age.

He has been severely, and not unjustly, censured for that system of corruption by which he almost avowed that he governed the nation; but the objects which he had in view are now acknowledged to have been in a high degree praiseworthy. Johnson, who in the earlier part of his life had joined the other wits in writing against his measures, afterwards honoured his memory for the placability of his temper, and for keeping this country in peace for so many years; and Mr Burke has lately * declared, that his only defect as a minister was the want of sufficient firmness to treat with contempt that popular clamour, which, by his yielding to it, hurried the nation into an expensive and unjust war. But his rancorous prosecution of Atterbury bishop of Rochester (see **ATTERBURY**), by a bill of pains and penalties, may be considered as something worse than a defect: it was a fault for which no apology can be made; because, whether that prelate was innocent or guilty, of his guilt no legal proof ever appeared. In that instance the conduct of the minister was the more extraordinary, that on other occasions he chose to gain over the dissatisfied by mildness and beneficence, even when he had sufficient proofs of their guilt. Of this the following anecdote, communicated by lord North to Dr Johnson, is a sufficient proof. Sir Robert having got into his hands some treasonable papers of his inveterate enemy Shippen, sent for him, and burnt them before his eyes. Some time afterwards, while Shippen was taking the oaths to the government in the house of commons, Sir Robert, who stood next to him, and knew his principles to be the same as ever, smiled; upon which Shippen, who had observed him, said "Egad, Robin, that's hardly fair."

To whatever objections his ministerial conduct may be liable, in his private character he is universally allowed to have had amiable and benevolent qualities. That he was a tender parent, a kind master, a beneficent patron, a firm friend, an agreeable companion, are points that have been seldom disputed; and so calm and equal was his temper, that Pulteney, his great rival and opponent, said, he was sure

that Sir Robert Walpole never felt the bitterest invectives against him for half an hour.

About the end of queen Anne's reign, and the beginning of George I.'s, he wrote the following pamphlets. 1. The Sovereign's Answer to the Gloucestershire Address. The Sovereign meant Charles duke of Somerset, so nicknamed by the Whigs. 2. Answer to the Representation of the House of Lords on the State of the Navy, 1709. 3. The Debts of the Nation stated and considered, in four Papers, 1710. 4. The Thirty-five Millions accounted for, 1710. 5. A Letter from a foreign Minister in England to Monsieur Pettecum, 1710. 6. Four Letters to a Friend in Scotland upon Sacheverell's Trial; falsely attributed in the General Dictionary to Mr Maynwaring. 7. A short History of the Parliament. It is an account of the last Session of the queen. 8. The South-Sea Scheme considered. 9. A Pamphlet against the Peerage Bill, 1719. 10. The Report of the Secret Committee, June 9th, 1715.

WALRUS, in zoology. See **TRICHECUS**.

WALSH (William), an English critic and poet, the son of Joseph Walsh, Esq; of Abberley in Worcestershire, was born about the year 1660. He became a gentleman-commoner of Wadham college, Oxford, but left the university without taking a degree. His writings are printed among the works of the Minor Poets, printed in 1749. He was made gentleman of the horse in queen Anne's reign; and died in 1708. He was the friend of Mr Dryden and of Mr Pope; the former of whom esteemed him the best critic then living; and Mr Pope has celebrated his character in the Essay on Criticism.

WALSINGHAM, a town of Norfolk, with a market on Fridays, and a fair on Whit-Monday, for horses and pedlar's ware. It is seated not far from the sea; and in former times was famous for its college of canons, and was greatly frequented by pilgrims who went to pay their devotions to the image of the Virgin Mary at the chapel, where there are two fine springs, called the *Virgin Mary's wells*. Not many years ago there were found here 100 urns full of ashes by a husbandman, which were supposed to be those which the Romans filled with the ashes of the dead. It is 22 miles north-west of Norwich, and 117 north-north-east of London. E. Long. 0. 53. N. Lat. 52. 56.

WALSINGHAM (Thomas), an English Benedictine monk of the monastery of St Alban's, about the year 1440. He applied himself to the history and antiquity of his country, in quality of historiographer to the king; and composed the History of King Henry VI. with other works.

WALSINGHAM (Sir Francis), minister and secretary of state during the reign of queen Elizabeth, and one of the greatest politicians of his time, was descended from a noble and ancient family at Chislehurst. After having made great progress in his studies at Cambridge, he was twice sent ambassador to France, and at his return to England was employed in the most important affairs; became secretary of state, and was one of the commissioners for the trial of Mary queen of Scotland. Sir Francis was undoubtedly one of the most refined politicians and most penetrating statesman that any age ever produced. He had an admirable talent, both in discovering and managing the secret recesses of the heart. He had his spies in most courts in Christendom, and allowed them a liberal maintenance; for it was his maxim, That knowledge cannot be bought too dear. In 1587 the king of Spain having made vast preparations, which surprised, and kept all Europe in suspense, Walsingham employed his utmost endeavours for the discovery of that important secret; and accordingly procured intelligence from Madrid, that the king

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king had informed his council of his having dispatched an express to Rome, with a letter written with his own hand to the pope, acquainting him with the true design of his preparations, and begging his blessings upon him; which for some reasons he could not disclose till the return of the courier. The secret being thus lodged with the pope, Walsingham, by means of a Venetian priest, whom he retained at Rome as a spy, got a copy of the original letter, which was stolen out of the pope's cabinet by a gentleman of the bed-chamber, who took the key out of the pope's pocket while he slept. After this, by his dexterous management, he caused the Spaniards bills to be protested at Genoa, which should have supplied them with money for their extraordinary preparations; and by this means he happily retarded this formidable invasion for a whole year. In short, he spent his whole time and faculties in the service of queen Elizabeth; on which account her majesty was heard to say, "That in diligence and sagacity he exceeded her expectations." However, after all his eminent services to his country, this great man gave a remarkable proof at his death, which happened on the 6th of April 1590, how far he preferred the public interest to his own, he being so poor, that excepting his library, which was a very fine one, he had scarcely effects enough to defray the expence of his funeral. His principal works are, 1. Memoirs and Instructions for the use of Ambassadors, with his Letters and Negotiations. 2. Political Memoirs.

WALTHERIA, in botany; a genus of plants in the class *monodelphia*, and order *triandria*; and in the natural system arranged under the 37th order, *Columniferae*.

There is only one pistillum, and the capsule is unilocular, bivalved, and monospermous. There are three species, none of which are natives of Britain.

WALTON (Bryan), bishop of Chester, a learned English divine, who gained great reputation by his edition of the Polyglot bible, with his Prolegomena in the beginning; which is more exact, says Father Simon, than any other which had been published on that subject. He died in 1661.

WAMPUM, the money used by the North-American Indians. It is much used in all their treaties as a symbol of friendship. It is made of a shell of a particular species of *VENUS*.

WAPENTAKE, is all one with what we call a *hundred*; especially used in the north countries beyond the river Trent. The word seems to be of Danish original, and to be so called for this reason: When first this kingdom, or part thereof, was divided into wapentakes, he who was the chief of the wapentake or hundred, and whom we now call a *high constable*, as soon as he entered upon his office, appeared in a field on a certain day on horseback with a pike in his hand, and all the chief men of the hundred met him there with their lances, and touched his pike; which was a sign that they were firmly united to each other by the touching their weapons. But Sir Thomas Smith says, that anciently musters were made of the armour and weapons of the several inhabitants of every wapentake; and from those that could not find sufficient pledges for their good abearing, their weapons were taken away and given to others; from whence he derives the word.

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WAR is a great evil; but it is inevitable, and oftentimes necessary. If he who first reduced to rules the art of destroying his fellow-creatures, had no end in view but to gratify the passions of princes, he was a monster, whom it would have been a duty to smother at his birth: but if his intention was the defence of persecuted virtue, or the punishment of successful wickedness, to curb ambition, or to oppose the unjust claims of superior power, mankind ought to erect altars to his memory.

War, in the last case, is the most necessary and useful of all the sciences: the various kinds of knowledge which ought to furnish the mind of a soldier are not without great difficulty to be attained. Of most other sciences the principles are fixed, or at least they may be ascertained by the assistance of experience; there needs nothing but diligence to learn them, or a particular turn of mind to practise them. Philosophy, mathematics, architecture, and many others, are all founded upon invariable combinations. Every man, even of a narrow understanding, may remember rules, apply them properly, and sometimes draw just consequences from them: but the science of war branches out into so many particulars; it takes in so many different parts; there are so many reflections necessary to be made, so many circumstances and cases to be brought together; that it is only by a continual application, grounded upon the love of his duty, and an inclination to his profession, that any man can attain it.

To march an army in every sort of country, whether open, woody, or mountainous; to know how to form a camp in all those countries, with which the general must be thoroughly acquainted in order to do it with security; to make a proper disposition for a battle, whether with a view to the posture of the enemy, or to the situation of the country; to foresee events which depend in a manner upon

chance; to be capable of making a good retreat on proper occasions; to direct the forages without fatiguing or exposing the troops; to send out detachments with precaution; to conduct the convoys in safety; to know how to canton an army; to establish magazines in places, both safe and within reach of the army, so that it shall never be in want of subsistence—these are the great ends of the military science.

It is commonly thought sufficient for a military man to know how to obey; and it is also supposed that the success of a day cannot be dubious, if a general joins the confidence of the soldiers to personal courage, a cool head, and a knowledge of the country.

It is true that, in cases of perplexity, many generals have in a great measure owed to their own capacity, and the confidence their soldiers have reposed in them, the advantages they have gained over the enemy; and confidence will always be reposed by the soldiers in that general in whom they perceive coolness united with courage. At the battle of Cannæ, when Gisco seemed to be much astonished at the superiority of the enemy's number, Hannibal answered him coolly, "There is, Gisco, a thing still more surprising, of which you take no notice. Gisco asking him what it was, "It is (replied Hannibal) that in all that great crowd there is not one man whose name is *Gisco*." Plutarch observes, that this coolness of Hannibal greatly animated the Carthaginians, who could not imagine that their general would joke at so important a time, without being certain of overcoming his enemies.

Although bravery and courage are the most essential qualifications of a subordinate officer, yet he should not be deficient in those which are required in a general, and which have been already mentioned; obedience to the orders de-

livered.

livered to him is no longer a virtue than whilst he comprehends and knows the intention of them. War, says a celebrated author, is a business which, like all others, must be learned; it supposes some qualities to be born with us, and demands others which are to be acquired: but since all these qualities must have the original source in genius, a man who proposes war for his profession, should never engage in it without having consulted his natural bent, or without knowing the particular turn and power of his mind. Ability, whether in a general or an officer, is the effect of his genius, quickened by a natural liking to his business.

A quick eye, which is of great importance to a soldier, is natural to some, and in them it is the effect of genius; others acquire it by study or experience; he who knows how to command himself, and has courage enough to keep himself cool on the most urgent occasions, has the readiest and quickest eye. A quick, hot-headed man, however brave, sees nothing; or if he does, it is confusedly, and generally too late.

It is this quick eye which enables a general to judge of an advantageous post, of a manœuvre to be made, and of a good disposition for the troops, whether with respect to that of the enemy, or to the situation and nature of the country.

The quick eye is no other than that penetrating genius which lets nothing escape it. A general who knows how to unite this quality with perpetual coolness, never is in want of expedients; he will see how those events, which to any other would be the preface of his own defeat, may end in the overthrow of his enemies.

The choice of the general officers depends upon this genius, which discovers every thing; they ought to be the right-hand of the general, and as capable of commanding the army as himself. Whatever good dispositions a general may make, they must prove ineffectual if not seconded by the general officers under his command; he cannot be everywhere, neither can he foresee all exigencies that may arise. He is obliged to give only general orders; it is therefore the business of those who command under him to know how to take the advantage of a wrong movement of the enemy; to take upon them to attack, or sustain the troops which are engaged; and, as circumstances vary, to make them advance towards the enemy, either to keep him back or to attack him.

But the qualities already mentioned would be useless, if order and discipline were not severely observed: the most numerous and best composed army would soon become little else than a body of rangers, who being only united by the hope of booty, would separate as soon as that motive ceased; and trusting each to his own head, or indulging his own humour, would be cut in pieces party by party: so that if the general does not keep up subordination (the soul and strength of discipline), his army will be nothing more than a troop of Tartars acting more from the hope of plunder than the desire of glory. What art and what genius is there not requisite to maintain this subordination? Too much severity disgusts the soldier, and renders him mutinous; too much indulgence sinks him into indolence, and makes him neglect his duty; licentiousness causes that subordination to seem burdensome, which should never in any degree be given up: he loses that respect, and often that confidence, which he should have with regard to his officer; and indulgence often makes a well-disciplined body become a set of sluggards, who march against their will, and who, on the most pressing emergencies, think only on their own safety.

Besides these qualities, which are essential to a general,

and which all who would attain that rank ought of course to have, there are still many others necessary to make a great man. A general who would merit the title of a hero, ought to unite in himself all civil, military, and political excellence. It is by this that he will easily attain to make war with success: nothing will escape him; he will know without difficulty the genius of every country, and of the nations which compose the enemy's army, the abilities of the generals who command, and the nature of the troops under them; he knows that he may venture a motion with some troops that he would not dare to attempt with others that are equally brave. One nation is vehement, fiery, and formidable in the first onset; another is not so hasty, but of more perseverance: with the former, a single instant determines success; with the latter, the action is not so rapid, but the event is less doubtful.

No man is born a general, although he brings into the world with him the seeds of those virtues which makes a great man: Cæsar, Spinola, Turenne, the great Condé, and some others, showed, even in their earliest years, such qualities as ranked them above other men; they carried within them the principles of those great virtues which they drew forth to action by profound study, and which they brought to perfection by the help of practice: those who came after them, with perhaps fewer natural talents, have by study rendered themselves worthy of being compared to them. Cæsar and all conquerors had this advantage, that they were able to make their own opportunities, and always acted by their own choice. A man may be a good general without being a Marlborough or a Turenne: such geniuses are scarcely seen once in an age; but the more they are raised above the rest of mankind, the more they ought to excite emulation. It is by endeavouring to surpass the intellects of the second rate; it is by striving to equal the most sublime, that the imitation of them is to be attained. This passion in a soldier is neither pride nor presumption; it is virtue: and it is by this only that he can hope to be serviceable to the state, and add to the glory of his king and country.

How much soever the honour of commanding armies may be sought after, it degrades him who is not worthy of it; this rank, so much desired, borders on the two extremes of glory and ignominy. A military man who labours to make himself capable of commanding, is not to be blamed; his ambition is noble: by studying the art of commanding, he learns that of obeying and of executing. But it is astonishing in the highest degree to see soldiers thinking only on preferment, and neglecting the study of their business. It is perhaps less surprising if we see others, without having been tried, proposing to themselves to command in chief; because such attempts suppose in the projector an absurd temerity, founded on a profound ignorance of the talents he ought to have, and the virtues which he has not. Such boldness is the character of a man whose mind is too narrow to perceive his danger: We should rather approve the timidity that suffers itself to be dejected by terror, since it shows at least that he knows to what hazards he is exposed; both one and the other are blameable: modesty is the only proper quality of a soldier; it gives splendour to virtue, it argues diffidence of himself, and desire of arriving at perfection.

The title of general would be less tempting, if proper attention was paid to the qualities it requires, and the duties it imposes; it would then appear a very honourable, but painful burden. The most firm and intrepid genius might be discouraged, merely by thinking that on the conduct of a general depends the fate of the state, the glory of his prince's arms, and his own reputation.

But

Defensive
Operations.

But yet the reward that follows such irksome labours ought to animate men to undertake them. Obstacles, however numerous they may be, are not insurmountable, since so many great men have got the better of them: difficulties should stir up a soldier's emulation, but should never terrify him; he should endeavour to copy such great originals, though he should not be able to equal them.

THIS treatise is divided into four parts.

In the first are mentioned all the greater operations of a

campaign; and the means of executing those operations, in any kind of country, are endeavoured to be laid down.

In the second, the precautions that are to be taken to attack the enemy in all the forementioned operations, are considered.

The third treats of the *Petite Guerre*, or the operations of detached parties, and the war of posts.

The fourth, of sieges, both with regard to attack and defence.

Defensive
Operations.

PART I. Of the GREATER OPERATIONS in DEFENSIVE WAR.

SECT. I. Of the Knowledge of a Country.

A CAMPAIGN of which the plan is well formed, and the dispositions well concerted, may nevertheless prove unsuccessful, if the general, to whose direction the operations are intrusted, hath not a thorough knowledge of the country in which they are to be carried into execution.

There is one knowledge of a country, which for an officer to be without should be considered as a reproach; that of the situation of cities, towns, villages, forests, streams, rivers, which is to be acquired by studying of geographical maps. There is another branch of knowledge yet more particular, such as, of the passes, or the boundaries of the country, the situation, the nature of the ground, whether it is plain, or divided by hollows, rivulets, hills, &c. which is to be acquired by the assistance of topographical maps. In the study of these last, care must be taken, not blindly to follow the marks they lay down. It very seldom happens, that topographical maps are perfectly exact: for, besides the many circumstances which may sometimes in a year alter a large extent of country, they seldom take notice of fords, bridges over the small rivulets, small hills, and hollows of little importance; neither can they mark whatever may be occasioned by recent inundations and disruptions of the earth: whereas any of these unforeseen circumstances may prove an obstruction to a great design, either by retarding the march of an army, preventing a column of troops from advancing, or leaving the enemy in possession of some passes from which he might have been driven.

In order to avoid the errors into which a general may be drawn by the maps, the safest method is to apply to the inhabitants of the country, go over it with the most intelligent of them, and remark every obstacle, however trifling it may appear.

For marching with greater security, a general ought to form a company of guides of the peasants, be assured of their fidelity, and attach them to him by all possible methods, particularly by unbounded liberality. It is by money only that trusty spies and faithful guides can be secured; the latter are less expensive, but full as necessary as the former. Parsimony should be avoided in war; for, as Vegetius observes, money should never be spared when expence is necessary to secure possession. In proportion as an army advances into a country, great care must be taken to change the guides.

The general should send out detachments along with some of these guides to examine the streams which cross the country, whether or no their mouths are at a distance, into what river they empty themselves, from whence they take their source, whether they may be easily forded, if their banks are steep or sloping, marshy or covered with bushes; other detachments should be employed in examining the woods, in order to find out whether troops can pass through them or not.

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A general ought himself to examine into the truth of the reports made to him by these small detachments, or send out others more considerable under the command of general officers: however certain a general may be of the fidelity of his spies and guides, yet he should not always rely upon their reports: mistrust, which in general is accounted a vice, may almost be esteemed a virtue in the business of war.

Furnished with these lights, a general can allot the easiest road to the artillery and baggage, the shortest to the infantry, and longest to the cavalry: he can at once judge, from the nature of the ground, into how many columns the army can be divided in order to expedite the march, and what dispositions will be necessary for the columns with regard to the enemy's position.

By the knowledge of the country, a general is informed of what camps the enemy doth or can occupy, and of those necessary to be taken to oppose his designs; whether the enemy's detachments can easily approach, or how he can himself advance towards him, without being discovered; if there is forage in the neighbourhood of the enemy's camp, or whether he is obliged to draw it from a distance; where he hath fixed his magazines, and whether an attempt to carry them off is practicable or not; in what manner his quarters are disposed, and which of them is most exposed; what distance there is between himself and the enemy; where the enemy hath established posts, and which those are that himself ought to occupy with regard to the situation of his own camp and quarters, and those belonging to the enemy; which is the properest road for the detachments and the patrols to keep, in order to gain intelligence; and lastly, with what degree of ease the enemy can attack the army on its march, and whether in front or flank. This knowledge is essential to a general in every kind of country; but in a woody or mountainous country it would become more particularly dangerous, and even impossible for him to march an army, if unacquainted with it.

In 1702, the duke of Burgundy, being desirous to attack the enemy who were behind Cleves, but not being perfectly acquainted with the forest in his front, he detached the marquis d'Alegre with 500 grenadiers, and 800 horse, to see if it was not possible to find some passage thro' it. M. d'Alegre met with a defile which was occupied by the enemy: he attacked and forced it; but being advanced beyond it, found it was not possible to proceed farther, by reason of the great number of defiles that succeeded to each other: he thereupon turned back, sent, and had another passage surveyed, where there were found still greater obstacles. He gave an account of this to the duke of Burgundy, who, not choosing to miss the opportunity of attacking the enemy, sent him out again with a larger detachment, that he might examine whether, by keeping along the side of the forest, it would not be practicable for him to march up to them by way of the heaths of Mook, on

Defensive Operations. the side of Grave and Nimeguen. The marquis d'Alegre discovered a defile which led to these heaths: he took possession of it, and sent notice thereof to the duke of Burgundy; who ordered the army to advance, obliged the enemy to send their infantry into Nimeguen, and cannonaded their cavalry which had taken post on the glacis, but were unable to maintain it; and the consequence was, that the enemy sustained a great loss in men, artillery, waggons, and baggage.

This example tends to prove, that maps are not always to be relied on. There can be no reason to doubt that the duke of Burgundy was furnished with the most exact: but yet it is probable that he might not have succeeded in this enterprise, if he had neglected sending M. d'Alegre to survey the passes, and examine two, before he proceeded to that through which he marched.

The following is a general rule: That it is upon the ground, and not upon maps, that the roads through which an army is to march must be examined, as well as the situation of places where camps are to be fixed, and fields of battle chosen. An army should never move before ways are opened for every column: with regard to a detachment it is different, as there may arise circumstances which will prevent the general from foreseeing what road it may take. The command of a detachment should always be given to an intelligent officer, and one who has made his business his only study; who hath been particularly careful to acquire a knowledge of the country, and of whose genius the general should entertain no doubt. A particular choice stirs up emulation in young men, and induces them to exert their utmost endeavours to deserve so distinguishing a mark of approbation.

Into how many mistakes have even the greatest generals fallen, by not being thoroughly acquainted with a country, and by suffering themselves to be guided by general notions? M. de Feuquieres cites many examples of great enterprises which have miscarried by it.

Toward the end of the year 1673, when a considerable body of infantry, with only few cavalry, was on its return from Holland, under the conduct of M. de Luxembourg, the prince of Orange having assembled the whole force of the Dutch and the Spaniards (under his command), came upon the Maese, with an intention to fight M. de Luxembourg between Maestricht and Charleroy. This march made it necessary for the court to send an order to M. de Schomberg to assemble all the cavalry that were in Hainault and Flanders, and immediately join M. de Luxembourg, who was greatly inferior to the prince of Orange in cavalry. The prince's aim then should have been to prevent the two generals from joining, and to have fought one or other of them before their junction. The prince's being unacquainted with the country, made him mistake for real the feints made by M. de Luxembourg, whilst he was upon the river Ourte; as if his intention was to march by way of the Condros and the Ardennes, in order to gain Sedan and the Mezuris. The prince of Orange drew near Huy and Namur; and by that means was at such a distance from the high-road, that M. de Schomberg had an opportunity of advancing with his cavalry to Tongres; at the same time that M. de Luxembourg, by a forced march, passed the Maese at Maestricht, and arrived at Tongres, where the junction of the two armies was effected without any accident.

If the prince of Orange had made only two reflections upon the nature of the country, he would have avoided the mistake he fell into; the first of which is, that scarcely any body can be ignorant that the Condros and the Ardennes are sterile and mountainous countries; from whence it is evident, that M. de Luxembourg could not have subsisted

his army, especially in the month of December: the roads in those parts, very bad in the summer, are almost impassable during the winter; consequently the carriages could not have passed but with the utmost difficulty.

The second reflection is, that if M. de Luxembourg had actually designed to pass through the Ardennes, why did M. de Schomberg advance towards Tongres, and so expose himself to the danger of being beaten, without a possibility of receiving help from M. de Luxembourg, who was on the other side of the Maese? If the prince of Orange had had a thorough knowledge of the country through which M. de Luxembourg pretended he would pass, he would soon have perceived that it was only to throw him into a perplexing uncertainty with regard to the road which the enemy's general should naturally take: in a word, he would not have remained a moment in doubt on the part he had to act.

By this, then, it appears, that the prince ought to have continued on the side of Liege; by which position he would have stopped M. de Schomberg, who would have scarcely dared to advance to Tongres, nor would M. de Luxembourg have attempted the passage of the Maese at Maestricht: by this means, the junction would have been prevented; or, if either of the two armies had advanced, the prince could have attacked and beaten it; neither would it have been in the power of the other to have assisted it.

It hath frequently happened, and will continue to do so, that a general who knows how to take advantage of the knowledge of the country, although inferior in point of force, may change a defensive into an offensive war. In 1671, M. de Créqui, who began the campaign on the defensive, ended it with obliging the duke of Lorraine to pass the Rhine: that prince dispersed his army, and then M. de Créqui formed the siege of Fribourg.

The knowledge of a country is still more essential in retreats: there is more art and more precaution required in a retreat than in any other action; that operation is the conclusion of all preceding ones. If a general, obliged to retreat precipitately, hath but a superficial knowledge of the country, how will he be able to re-assemble his troops, re-establish order, or march with any degree of security?

Xenophon's retreat with the ten thousand Greeks is one of the most useful lessons a commander can study: in that undertaking were united the virtues of a consummate general, and the most intrepid courage of a soldier; and in particular it exhibits the most profound knowledge of the country.

The knowledge of a country is as necessary for a private officer as for the commander in chief, because he is to execute with part what the general performs with all the troops. When an officer, to whose conduct an expedition is intrusted, joins this knowledge, one of the chief branches of military science, to practice and experience, he will with so much the greater ease comprehend and execute the general's intention and plan; and he will be also enabled to take the properest measures for success: if, on the contrary, he begins a march, without being acquainted with the country, his mind misgiving him, will increase the danger, by the very means he takes to avoid it: he will suppose it in places where there is nothing to be feared, and often fall into it where he was least apprehensive of it.

The general who commands in the cantonments and winter-quarters, and each officer who commands a particular quarter, will never be able to take proper measures if they are unacquainted with the country: they will be unable to preserve a proper strength when separated, or to assemble without difficulty on the first order; and for want of know-
ing

Defensive Operation. ing the posts which it is proper to guard, they will occupy such as are unnecessary, and leave those defenceless that are most liable to be attacked; the troops will be greatly fatigued by increasing the number of posts without occasion, by superfluous or too numerous detachments or patrols. In a word, whatever precautions are taken within, the quarters will never be in security, if the country round about them is not perfectly known, and every important pass between them and the enemy occupied.

SECT. II. *Of the Preparations before taking the Field, and the March of an Army on leaving its Quarters to go into Cantonments.*

THE time for an army to come out of winter-quarters, is always regulated by the plan which the general has formed for the ensuing campaign. But whether by the situation of the quarters the army is enabled to enter immediately on the campaign, or whether it must be first of all cantoned, the magazines should be so situated as to be always within reach, especially in that early season of the year, when there can be no forage upon the ground, and consequently the cavalry must be subsisted out of the magazines. The magazines ought to be distributed about in different parts, that the troops may have less way to go for their forage. And this distribution should be regulated by the movements which the general foresees the army will make on leaving its quarters, supposing it leaves them when there is only dry forage; but if the army is in an enemy's country, and there is forage upon the ground, it is certainly better to reserve the magazines entire, by which not only great trouble will be avoided in transporting the forage, but also a great expence saved to the government.

Of what nature soever the country may be (an enemy's country is supposed), it should be foraged in front as much as possible, in order to reserve that which is in the rear, that, when the campaign is over, it may be found laid up in the barns: if this precaution is not attended to, the army will be destitute of forage at its return, and will of course be obliged to draw it from home, and consume those magazines which were before spared; consequently there will be nothing saved, the expence will only have been deferred, but it will be increased by transporting the forage from the magazines to the army.

The forming of the magazines should never be delayed till the time for opening the campaign approaches. The intendant, pursuant to the general's order, should lay in the provisions during the winter, and distribute them in the frontier towns, by which means they can easily be transported to whatever place the general shall order. By these precautions, the general will not only avoid the inconvenience of being obliged to wait till there is forage upon the ground, but he will also be enabled to be first in the field. The same precautions should also be taken with respect to the artillery. It should be assembled upon the glacis of the frontier towns, or rather upon that of the conquered places: the more it is within reach of readily joining, the sooner the operations will be commenced.

From prudence in the execution of these dispositions, as well for the magazines and for the artillery, as for every thing that is necessary to an army, it follows, that a general hath often formed a siege, or at least invested a place, and completed his lines of circumvallation, before the enemy could be in a condition of coming out of his quarters: he may likewise have made many marches, and will possess himself of advantageous posts, without the enemy having it in his power to oppose him.

A general should observe, that, in order to cause his

Defensive Operation. army to be cantoned within a march of the country where he designs to commence the operations, he must make all the troops leave their quarters together; assemble them in many bodies in different frontier towns; proportion the marching days to the distance of the quarters and the rendezvous that shall have been appointed for them, that they may arrive on the day appointed, and that from thence they may march in a body to the place where they are to canton.

All the bodies march, either in the number of columns that the situation of the country will allow, and arrive at the cantonment together; or else they march separately, and arrive on different days: but, in either of these cases, the cantonments for each regiment ought to have been marked out; and, if possible, forage for at least three or four days distributed to each quarter.

In the marching-orders which are sent to each commander, the situation and name of the place where each regiment is to canton, should be carefully expressed; whether on the right, the left, or in the centre: the discipline to be there observed, the place where to go and receive orders, and that where to receive forage, should also be particularly specified.

Troops, when upon a march, should always observe the most exact discipline; and never be suffered to advance, but in the same order, and with the same precaution, as if they were in danger of being molested or attacked.

Whenever an army is cantoned, it is generally in an enemy's country; therefore, for the greater security of the cantonments, there should at least be one place that may serve for a support. If no place of this sort can be found, the army must then march out together and encamp, instead of going into cantonments.

As the cantonments are properly nothing more than a halting place, where the troops are to remain till the season permits them to take the field, till the proper quantity of forage is collected, or till the necessary preparations for the intended operations are completed, they should be more connected than the winter-quarters. But as soon as the weather permits, and all the necessary preparations which should have been forwarded during the winter are finished, there is then no time to be lost; for an army will always find its advantage in encamping early, getting the start of the enemy as much as it possibly can, and beginning the campaign, no matter by what operations, before the enemy can have time to assemble.

If any particular column, upon the march, presents its flank to any of the enemy's towns, although it is indispensably necessary for every column to observe all possible order and discipline on the march, yet this column is more particularly obliged to it; necessity makes it become a duty. But that it should not be too much exposed, some hussars ought to be appointed to march upon its flank, who should also be ordered to advance till they come within sight of those towns. This column, whether consisting of infantry or cavalry, must detach some troops to sustain the hussars, in case they should be attacked and repulsed. By posting these detachments upon the flank, the enemy will be kept at a distance from the column, and the hussars will be also sustained.

SECT. III. *The March of an Army in an open Country.*

To direct the march of armies is not the least difficult part of a general's duty, and it is only by a thorough knowledge of the country that he can perform this duty; that he can concert the measures for conducting them in safety;

Defensive Operations. safety; and that he will be enabled to foresee the enemy's motions.

There are but three sorts of countries which may become the theatre of war; an open country divided by rivers, a woody, or a mountainous one.

When an army is in an open country, the general may take whatever road he thinks most convenient, without being under a necessity of keeping the beaten road. If he chooses to march across the country, it may be done by cutting down the hedges, filling up the ditches, levelling the ridges, filling up the hollow ways, thereby rendering their ascent or descent easy, and by building bridges over the streams and rivulets which divide the country. But nevertheless it is very imprudent for a general to suppose himself entirely free from danger upon a march; for the consequences of self-security are generally fatal. The effects of negligence in any military operation are pernicious, but more particularly so upon a march; and although a general should never fear his enemy when in presence of him, he should nevertheless always apprehend the worst from him when he is out of his sight.

The number of columns in which an army can march in an open country is arbitrary, whilst it is advancing, and the enemy at too great a distance to attack or annoy it upon its march. But if, on the contrary, the enemy is near at hand, and there is a possibility of his attacking the army, it should then be disposed after such a manner as to form in order of battle in a very short time, and to be able to take a favourable position for action upon the first signal.

If the army presents its flank to the enemy, the dispositions, without considering the probability of its being attacked, should be changed; for an army upon a march ought to be always prepared against any accident that may happen.

A general should never cause an army to move without having previously considered and examined the intended march of it, nor without a thorough knowledge of the enemy's position, and where he is, or without knowing particularly the ground intended to encamp on. An army ought never to move but with some design, either to seize on some advantageous post, to prevent an intended march of the enemy's, to draw him into a disadvantageous situation, to deprive him of subsistence, or to procure some for itself.

This maxim being established, let it be supposed, that a general would cause his army to march, and the enemy's distance to be also such as to secure him from any danger of attacks; he hath it in his power to open four, six, or eight roads, in proportion to the number of the troops under his command: for the greater the number of columns, the less is the body of troops contained in each; consequently there will be less confusion, and the sooner will the army arrive at its destined camp.

Before the march is planned, and the number of columns determined upon in which the army is to march, notwithstanding the general is acquainted with the country, he should send out a detachment some days before, to reconnoitre the intended route of the army, as well as the camp it is to occupy. This detachment is to be commanded by the officers of the day appointed for its setting out: they must have staff-officers and guides with them, to conduct and to inform them of the nature of whatever may prove an obstacle, of the places where the roads begin, and those where they terminate: they should also have labourers with them, to mend the ways, enlarge the roads, and make new ones, if necessary; to cut down the hedges, fill up the ditches, level the ridges of the hollows, and build or repair bridges.

When the general commanding this detachment is ready to enter the different ways through which the army is to follow, he will divide his detachment into as many separate bodies as the army is to be divided into upon its march; and distribute staff-officers, guides, and labourers, to each detachment, with orders to meet again at the same place from whence they separated.

Each of these detachments should advance to the extremities of the woods, if they meet with any, and of the roads leading to the camp, intended to be occupied: the commanding and staff-officers will then advance with an escort to reconnoitre its situation, and will leave part of their men in ambuscade in the woods, or concealed behind some heights, or in some hollows. The knowledge of the situation of the camp being attained, each detachment will return by the road it came; but first, the commanding officer of each detachment will make a report to the general of the roads they have passed, what discoveries they have made, and, in short, will give him a particular detail of every thing they have met with on their way, whether woods, villages, hollows, bridges, and of every thing they have done to render the road easy for the column that is to pass through it. This detachment being assembled at the place appointed for meeting, will take the road to the camp, where being arrived, the lieutenant-general will make his report to the commander in chief of the army.

With these precautions the army may not only advance in safety, but the roads also for every column having been reconnoitred and repaired, no accident can happen to retard the march of the army.

The general must take care to have detachments of hussars or dragoons always in the front and upon the flanks, to observe and clear the march of the army; neither should a general suppose himself to be in absolute security from the distance of the enemy: but whilst he sees all clear before him, it would show great weakness for him to be apprehensive of a surprise, especially when every necessary precaution for avoiding it hath been taken. It is certainly a mark of prudence to take precautions; but multiplying them without cause is an undoubted sign of fear and anxiety.

It is proper to make the army march, as near as possible, in the same order in which it is to encamp; by which means the troops may enter the camp without confusion. The army being supposed to march in six columns, the infantry will form three, the artillery and baggage the fourth; the cavalry, with the remainder of the corps of hussars that are not detached, and the dragoons, the two last upon the flanks; so that the army, on its march, will be in the following disposition: The column upon the right will consist of cavalry, the one adjoining to it of infantry, and that which comes next will be formed by the artillery and baggage; then two columns of infantry, and the sixth closing the left, will be composed of cavalry. It is to be observed, that, if the baggage-waggons belonging to the army form too long a row, some of them may be sent into the rear of the columns of infantry, with express orders to the officers to make them march in the column.

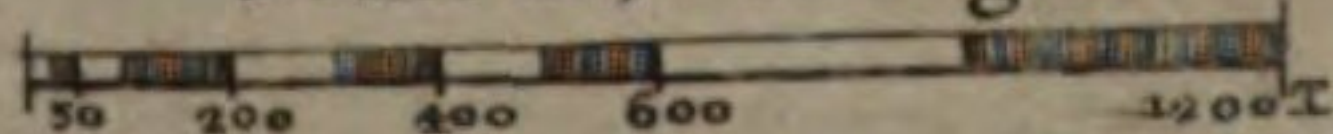
There should be an advanced and a rear guard to each column, formed from the troops of which the column is composed; there should be also detachments of light horse upon the flanks of the cavalry, in order to keep off any of the enemy's parties that might advance to annoy the army upon its march. The rear-guard to the column of baggage should consist of infantry, cavalry, or dragoons, besides the escort always appointed for it. The general officers who are at the head of the two columns of cavalry should not march too fast, lest they should get too far advanced before the infantry; a matter always to be avoided. The march

Plan of the March of an Army in Six Columns.



A. Bell Prin. Wal. Sculptor fecit.

Scale of $\frac{1}{2}$ a League.



WAR.

Plate DXV.

The March of an Army through a Mountainous Country.



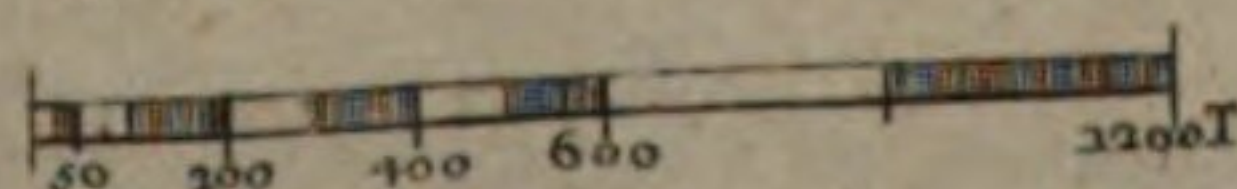
A. Bell. Prin. W. B. Sculptor fecit.

Plan of the March of an Army through a Woody Country.



A. Bell Pin. Wal. Sculptor fecit.

Scale of $\frac{1}{2}$ a League.



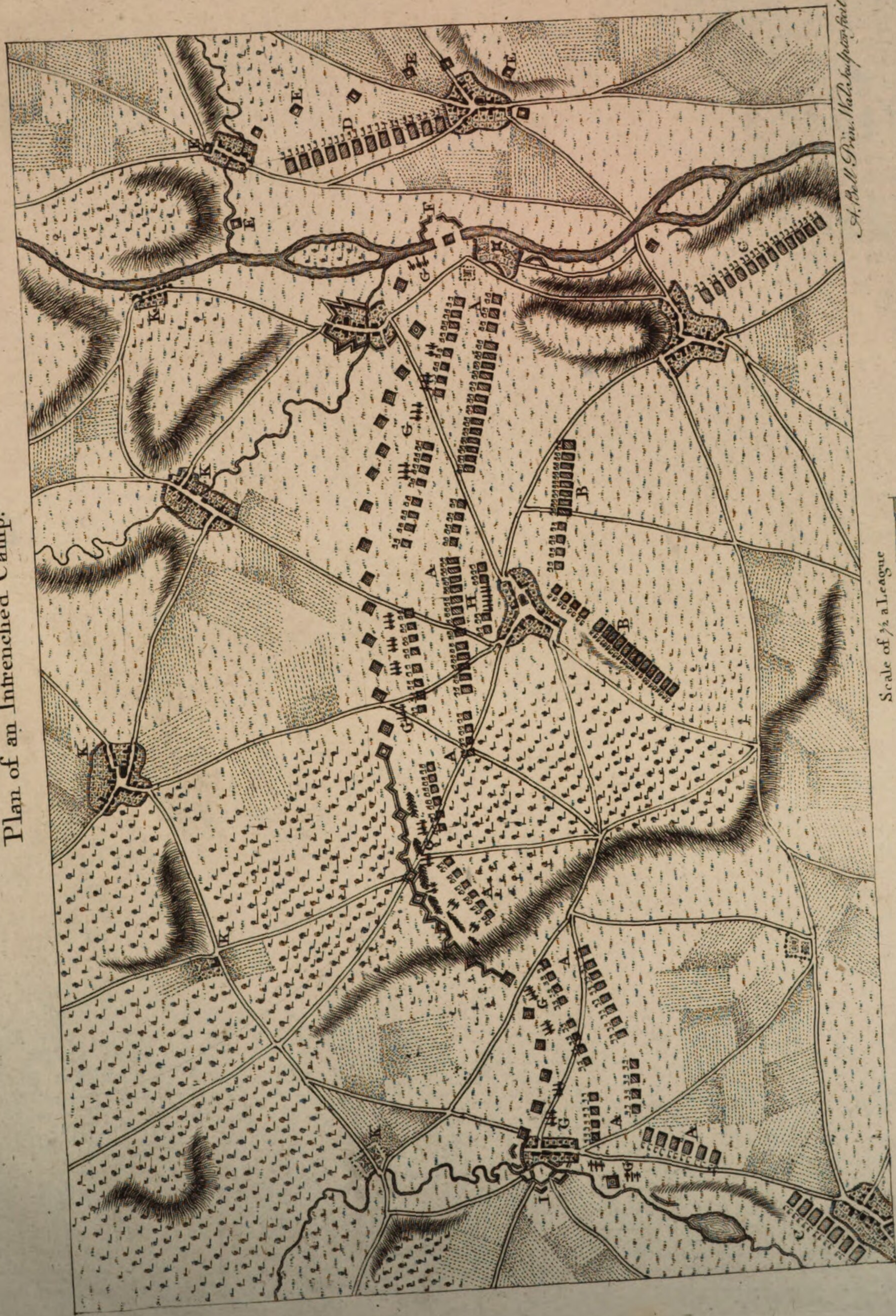
WAR.

Plan of the Position of an Army in its Camp.

Plate DXVII.



A. Bell. Pin. Nat. Sculptor fecit.



A. Bell Pin. N. L. S. 1864.

Defensive Operations. of an army being disposed after this manner, every column will enter the camp at the same time, and find itself opposite to its ground. See Plate DXIV, where *a* is the army formed in order of battle, ready to march. *b*, The park of artillery, where the baggage belonging to the army, and their escorts, also are assembled. *c*, March of the cavalry, to form the column on the right. *d*, March of the cavalry, to form the column on the left. *e*, March of the infantry, to form in three columns. *f*, March of the artillery and baggage, to form in a column. *g*, Parties of hussars, covering the flanks of the army, and forming the rear-guards of the column, when the army hath passed. *h*, Bridges and fords, discovered by the advanced detachments, who have marked the route of the army. *i*, Bridges built by the same detachments. *k*, Front and rear-guards of the columns drawn from the troops of which the columns are formed. *l*, Parties of hussars, marching upon the flanks of the army. *m*, Parties of hussars marching at the head of the army, to scour the country through which the army is to pass, and also to examine the routes marked by the advanced detachments.

If, by the enemy's position, although at a distance, the army should, on its march, present a flank to the enemy, without fearing its being attacked; yet as the enemy may have stolen one or two marches, as hath happened on many occasions, there must be only two columns of infantry placed in the centre. The third must be placed upon that flank which the army presents to the enemy; so that the army will find itself disposed upon its march after the following manner: Supposing it is the right which presents the flank to the enemy, the first column will consist of infantry, the second of cavalry, the third of artillery, the fourth and fifth of infantry, and the sixth of cavalry. The baggage will then be distributed to the three columns upon the left; so that neither the two columns upon the right, or the artillery, will have the least embarrassment, in case an action ensues. The same disposition must be made upon the left, if it is that which presents the flank. Particular care must be taken that the artillery have orders, supposing the enemy advancing in full force to attack, to transport itself to the column of infantry, and to divide itself along the front, when it shall be in order of battle, and to keep up a constant fire, in order to give the general time to make such dispositions as he shall find necessary.

The column of cavalry should be divided into two, and be posted upon the flanks of the infantry that is drawn up in the face of the enemy; the other columns must follow the orders which have been delivered to them, and execute them with the utmost dispatch.

If it appears, either from the proximity or position of the enemy, that the army is liable to be attacked in front, the disposition for the march should be in the same order as the army is to form in for action: the artillery must then be distributed among the columns of infantry; so that, following the divisions where it is placed, the brigades will find themselves spread over the front of the first line. In this case, the infantry will form four columns, which will march in the centre of the two columns of cavalry upon their flanks; so that the head of each column, as far as the

Defensive Operations. centre, when placing itself in order of battle, shall make the first line, and the remainder, from the centre downward, the second; and the reserve which follows shall form itself behind the other two lines.

It is necessary that an army disposed after this manner should have orders to draw itself into order of battle on the very first signal, which should be a discharge of two or three pieces of cannon. The signal being given, the first and second lines, and the reserve, will find themselves formed in a very short time. If, from the proximity and position of the enemy, and the facility with which he can attack, the general hath reason to imagine he will do it, the heavy baggage, with a good guard and escort, ought to be removed into the rear.

On this occasion the *campement* (A) should not be far before the army, the escort should be increased, and some detachments of light horse should march in front to cover it, and also to make observation at a distance. The remainder of the body of light horse shall continue upon the flanks of the army sustained by dragoons, who, on the signal being given, shall immediately go and form themselves in the place assigned to them during the action.

On the first sight of the enemy the *campement* should retire; for when fighting becomes necessary, all thought of encamping must be laid aside; but the escort shall put itself in order of battle, and the light horse shall approach the enemy as near as possible, in order to reconnoitre his disposition and strength. The officer commanding them will immediately send a report of the discoveries he hath made to the commander in chief, who on every occasion should be in the front, and even a little advanced, to survey the nature of the ground; it being very certain, that in these cases a man can much better rely upon his own than upon the judgment of others. This was marshal Saxe's method; particularly when he was apprehensive of being attacked upon a march, or had himself an intention of attacking. In proportion as the enemy shall advance, the escort of the *campement* must retire in good order; at the same time not neglecting the opportunity, if it offers, of harassing the enemy's advanced guard, so as to retard his march, and give more time for the army to form in order of battle, and to the general to make such dispositions as he shall judge necessary: after which, the escort having amused the enemy, or caused him to slacken the briskness of his march, must retire in good order; and when it shall be near the body of the army, each body shall return to its own brigade.

If, from his knowledge of the country, although an open one, the general knows there are any thickets, hollows, or heights, either on the right or the left, and that this spot may prove favourable to the enemy, he should try to possess himself of it. If that attempt is not practicable, as the enemy will undoubtedly take advantage of it, and post infantry either at these thickets or heights, the general must place a brigade of infantry at the head of each column of cavalry, which shall mix by platoons with that line of cavalry when formed in order of battle. This disposition was made by M. de Turenne at the action of Sinzheim, and at the battle of Enzheim.

If, by the situation of the country, the flanks cannot be sheltered

(A) This is a French term, for which we have not a synonyme equally expressive in the English language. It is used to denote a certain number of troops, who proportion their time of setting out before the army, by the distance or proximity of the enemy, in order to trace or mark out the camp. For this purpose, a quarter-master and a trooper is draughted from every troop of every regiment of horse; and a serjeant and a corporal, in like manner, from every regiment of infantry, furnished with ropes and pickets, to lay out the ground for the tents and the intervals; so that every regiment will, on its arrival, find its ground properly marked out. A field-officer of every regiment also marches with the *campement*, besides the officers of each corps, who command the detachment.

Defensive
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sheltered either by an hollow, a morass, a river, a town, or a village, the hussars and dragoons must be posted upon the wings, but sidewise, so as to be able to take the enemy in flank when he shall come down to charge the first line, or at least to keep back his second: these hussars and dragoons should be sustained by the infantry of the light troops belonging to the army. If the right can be formed next a village, and the left next an hollow, some infantry and artillery must be posted there: if there is only the right or the left that can be sheltered, that which cannot must be properly sustained; and the same disposition must be observed that hath been just now mentioned, with regard to an army whose flanks cannot be covered.

If, on leaving the camp, the army presents a flank to the enemy, who may have it in his power to attack it on the march, it must then march but in two or three columns at most. Each column should be disposed after such a manner, that by a motion to the right or to the left, according to the wing that is liable to be attacked, each battalion and squadron may find itself formed in order of battle before the enemy.

The advanced guard should be composed of light horse, sustained by dragoons: the rear-guard of cavalry sustained by infantry: there should be also some light horse upon the flanks of the cavalry, and some pieces of cannon with the infantry. The artillery should be distributed by brigades in the column of infantry nearest to the enemy; so that, performing the same movement as the troops, it may find itself placed in the front of the first line, ready to fire on the first order. The number of three columns is given to the army, in order that the first and second lines and the reserve shall be formed at the same time, which cannot be done if the army marches only in two columns: for troops must then be taken from these two lines in order to form the reserve, which would require a considerable time, and consequently retard the dispositions; whereas this reserve, forming the third column, is separated from the main body, and in a condition to act with readiness, according to the orders it shall have received. As the baggage, in this manner of marching, must necessarily be an embarrassment, it must be sent into the rear under a good escort, with orders to join the next day at the new camp.

SECT. IV. *The March of an Army in a mountainous and woody Country.*

If the situation of the places in a mountainous country furnishes a general with a greater variety of expedients to conceal his dispositions, it also renders more precautions, and a greater degree of knowledge, necessary to avoid being surprised. If these kind of countries, on the one hand, present greater advantages for the concealment of marches, they also, on the other, offer many difficulties in the transporting of the provisions and the artillery, and require a greater degree of vigilance for the safety of the magazines and the preservation of the communications with the frontier towns.

It is to be feared, that in mountainous countries, in roads that cannot be enlarged, the troops pressed too close together will not be able to move but with great difficulty; and as they will embarrass each other, the front, the rear-guard, and the flanks, must be equally secured; the columns must be unbroken and close, that there be no distance left between them; and halting should be particularly avoided, as that is a circumstance by which an army is most fatigued.

It is again dangerous, as the commentator upon Onofander observes, when troops find themselves straitened of room

in a narrow road, for the general, in order to enable them to move with greater ease, to lengthen the columns too much: from whence would arise two inconveniences; the first of which is, that the columns would be weakened, and that in case of a surprise it would not be difficult for the enemy to separate them entirely, and it would also be impossible for them to rally; in the second place, these columns thus lengthened, in going round a mountain and descending into a valley, would take up a prodigious extent; from whence it hath often happened, that the windings of the road hiding the middle of the column, those who march in the front rank can see only those who are in the last, and retard their march, because that, being deceived by distance, they will be scarcely able to distinguish whether they advance or whether they are halted.

In order to avoid these inconveniences, it is not barely sufficient for a general to have a thorough knowledge of the country: he ought immediately to inform himself of ever particular, however minute, relating to it; he should take the same precautions which have been pointed out as necessary for a march in an open country, and send out a detachment, such as hath been supposed in the foregoing section. This detachment will examine the narrow passes, survey and sound the fords, run round the windings of the mountains; and if there are many roads, it will find out which is the most practicable, and that through which the army, the artillery, and baggage, can pass with the greatest ease; what streams cross it, and whether there are bridges over them: it will examine whether they are sufficiently strong, and repair them, or build new ones. It often happens in a mountainous country, that the road which would be very short and commodious proves to be divided, either by the separation of two rocks or by hollows. As these breaches, however deep they may be, cannot be all of a certain breadth, therefore, in order to avoid marching over the unnecessary ground that going round them would take up, bridges should be thrown over, if possible, from one rock to another.

But as in a march, whether in an open or in a mountainous country, occasions for throwing bridges very often present themselves, it is very necessary to say a word or two relative to the manner of their construction.

Six or eight thick pieces of timber are laid across a rivulet, or any other bad place necessary to be passed, at six feet distance from each other; these must be crossed again by other pieces of timber not so thick, at the distance of three feet from each other; which must be fixed to one another by large pegs, and faggots well fastened together must be laid over them. When the bridge shall be thus covered, some earth must be thrown over it, which ought to be well trampled, in order to fill up the vacancies of the faggots; and then, for the greater firmness, new earth should be thrown over it, which ought to be well beaten down. The bridge thus made, the troops, the artillery, and the baggage, will pass over it with great ease.

It must be observed, that the bridges should be of the same breadth with the roads; they should be broader rather than narrower, because, exclusive of the danger the artillery and baggage would run if they were narrower, the ranks being obliged to be straitened and the column to be lengthened, the march would of course be retarded, and it would be difficult to avoid confusion. The labourers that accompany the detachment ought to be furnished with every sort of tool necessary for the removing of earth, the felling of trees, and working and fitting them for use.

On the report of the commanding officer of this detachment to the general, he will order as many detachments as there

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there are columns intended, to set out two or three hours before the time appointed for the march of the army. These detachments will march carefully over the ways already examined and prepared: they will scour every thing, hedges, narrow passes, entrances of passes, woods, heights, villages, in short all that may serve as shelter for troops in ambuscade; and for greater security, they will post guards in the villages, which guards are not to retire till the rear-guard of the army comes up.

The commanding officer of each detachment should possess himself of the heights on the right and left, and should distribute platoons of infantry at proper distances from the rocks and narrow passes: he should be careful of what may be done to oppose him, and be attentive even to the smallest paths. When the commanding officer of the detachment shall be advanced to the end of the passes, or to the ground intended for the camp, he will establish his infantry in the most advantageous posts; he will place his light horse or dragoons in the front, but within reach of assistance; he will send out patrols of light horse advanced before the infantry. If he receives any intelligence of the enemy, he will send immediate notice of it to the general; but if, from the report made to him, the enemy does not appear to be sufficiently strong to annoy the army on its march, or only some parties were willing to try if they could enter the passes, his detachment will be sufficient to keep them at a distance, particularly as he is in possession of the heights and the passes.

With such precautions as these, if the enemy is at too great a distance to attack the army, the march will be performed without any trouble: there will be no obstacle in the roads, or reason to fear that the waggons will be mired; and if the wheels or axle-trees of any of them should break, they will be repaired from those which have spare ones: if, on the contrary, the enemy should be so near as to give cause to apprehend an attack, the necessary precautions are taken for forming the troops in order of battle, and for the necessary dispositions during the action.

It has been already observed, that an army on a march should be divided into as many columns as the detachments have found openings or roads leading to the camp the general intends to occupy; suppose two, the army will consequently march in two columns. The disposition of the troops in their march differs entirely from what it would be in an open country; the advanced-guard of each column must consist of infantry, some must be distributed either in the narrow passes or on the heights, and there should be some advanced detachments or light horse to scour the narrow passes: the rear-guard should consist of infantry only. The remainder of the troops may be disposed after the following manner:

Four or five brigades of infantry, according to the number which composes the army, should be placed at the head of each column; the same partition should be made with regard to the artillery, which must follow the infantry; the cavalry must march next, and the baggage of each column, well escorted by infantry, must follow the cavalry; then the remainder of the corps of light horse which are not detached; and the dragoons are placed the last, in order to dismount and sustain the rear-guard in case it shall be attacked.

Each column should consist of the same number of troops as well infantry as cavalry. Platoons of infantry should be detached to march on the heights, at proper distances, in order to cover the flanks on the right and left. Care must be taken to march very leisurely in the front, otherwise the rear will not be able to keep up; then, in order to give the

rear time to come up, the front will be forced to halt, by which the march will be much retarded and the troops fatigued.

Plate DXV. represents the march of an army through a mountainous country. A is the position of the army before it begins its march. P is the artillery and baggage, with their escorts in the front of the camp. B, Parties of hussars forming the advanced-guard of the army on its march. C, Parties of infantry of the advanced-guards of the columns. D, The infantry of the army forming the head of the columns. E, The artillery, and waggons belonging to the artillery. F, Battalions of artillery. G, The cavalry. H, The baggage of the army. I, The escort of the baggage. K, Parties of hussars. L, Parties of dragoons. M, The infantry of the reserve, forming the rear-guard of the army. N, Platoons of infantry marching upon the heights, to cover the flanks of the columns. O, Villages in front of the camp the army is to occupy, and of which the light infantry have taken possession.

These dispositions are necessary, because, as the enemy in a mountainous country will be able to attack with infantry only, he must be opposed with troops of the same nature: the reason why the artillery is posted behind the infantry is, that in case the enemy should attack briskly in front, and the road through which the columns pass be broad enough, some pieces of cannon may be sent into the front, which firing with grape-shot will soon thin the enemy's ranks, and abate something of his ardour: if the road be too narrow to permit the bringing forward of the artillery, resolution must supply the want of that assistance which the cannon would give, and the enemy must be charged with bayonets. The cavalry does not follow immediately, because, not being able to act in this sort of country, it must be covered by infantry. The baggage which follows is sufficiently defended by the columns that cover it, and the infantry that escorts it: this infantry should nevertheless join as often as circumstances will permit, without being fearful of exposing itself, that upon the heights being to reinforce it in case the head of the army should be attacked.

There are some mountainous countries so difficult of access, that it is impossible for the cavalry to follow, because some post must either be immediately seized, or the enemy, being in possession of the hills, must be driven from them before it can advance; or because it would be difficult for it to be subsisted.

If the army can march in four columns, the dispositions should still be the same; but as the head of the columns will be weaker in infantry, the heights should be guarded accordingly, and the rear-guard sufficiently strong to resist the enemy: the same disposition should be made for one column only.

If the march is to be made through a woody country, the precautions which have been already mentioned in regard to examining the ways through which the army is to pass, and for the detachments which set out in order to be before the army, should still be observed; but the disposition and order of the troops must be different. If by the situation of the country, the army is obliged to march continually through woods till it arrive at the camp, the cavalry and the baggage should be in three columns in the centre; but some infantry should be placed at their head and their rear-guard: the infantry should march in two columns, one on the right, the other on the left of the cavalry and baggage; some brigades of artillery should be distributed to each column of infantry, the remainder must march at the head of the columns of baggage; the flanks of the columns must be covered by platoons of infantry, placed about at proper

proper distances, which are to follow the columns at 40 or 50 paces distance, without ever losing sight of them.

Plate DXVI. represents the march of an army through a woody country. A, Is the army formed in order of battle previous to the commencement of the march. B, The cavalry, which hath marched some paces in advance, in order to make room for the infantry. C, The infantry, which, by facing to the right, forms the column upon the right. D, The infantry, which, by facing to the left, forms the column upon the left. E, Bodies of infantry, which are to march at the head of the columns of cavalry. F, The park of artillery, where the baggage belonging to the army, and the escorts, also are assembled. G, The march of the infantry, forming in columns. H, The march of the cavalry, forming in columns. I, The march of the artillery and baggage with their escorts, forming in column. K, The army in march. L, Hussars of the advanced guard keeping the roads, marked out by the detachments sent on before. M, Infantry, forming the advanced guard of the columns. N, Small parties of infantry, marching upon the flanks of the columns. O, Parties of hussars, marching upon the flanks of the army. P, Infantry of the reserve forming the rear-guard of the army.

If by the knowledge which the general has of the country, or rather from the report of the officers who commanded the detachment sent out to view, open, and repair the roads, he knows that the country is interrupted by woods and little plains, the disposition ought to be wholly changed; it will then be sufficient that the second detachment, which in other cases ought to set out the evening before, sets out only two hours before the campement. This detachment should be composed of infantry, light horse, and dragoons; the infantry to scour the villages and the woods, the light horse to penetrate into the woods wherever they can enter, and clear the march of the infantry, and the dragoons to sustain the whole.

When the disposition for the march of the army is supposed to be in five columns, the infantry should form two, the cavalry two more, and the artillery and baggage the fifth. If it is thought there will be any occasion for artillery, a brigade or two may be distributed to the columns of infantry; and the remainder may march at the head of the escort of the baggage, which is to be defended by the regiment of artillery; to which must be added a detachment of infantry, which will form the advanced guard. The cavalry and dragoons are to keep the open country as much as possible, and the infantry the inclosed; and the best and most accessible road should always be given to the artillery and baggage. In order that the columns may preserve the same length in marching, a brigade of infantry should be placed at the heads of the columns of cavalry; if this precaution, which fixes the head of the columns of cavalry, is neglected, the cavalry will extend a great way before the columns of infantry, which should always be avoided. The rear-guard should consist of infantry, cavalry, or dragoons: the light horse should always march on the flanks on the right and left, and before the army.

It is after this manner that the march of an army may be disposed through a woody and a mountainous country; but an army must always suit its motions to circumstances, and to the situation of the country where the war is carried on. If the general is inferior in point of number, he should make choice of defiles; because in them he can always present a front equal to the enemy's. Who can be ignorant that Leonidas with 8000 Greeks, at the straits of Thermopylæ, stopped the almost innumerable army of Xerxes, who was unable to force him?

A mountainous and woody country, when thoroughly

known, becomes a more favourable theatre for practising the wiles and stratagems of war than an open country; it is true that the knowledge of it is more difficult to attain, and that it requires more vigilance and readiness in the general. Hannibal was even drawn into ambuscades by his own guides; an example worthy the notice of a general who takes guides that have either but little regard for him, or are unacquainted with the country: it is impossible to try them too much; and their ignorance is often more fatal than treachery itself.

The marches that require most precaution are those made in the night, those made in sight of the enemy, and those that should be kept secret.

The first should be avoided as much as possible; but if circumstances require and force an army to march over a mountainous country in the night, care should at least have been taken to survey the roads during the day; to make the guides march at the head of the army; to keep the ranks very close together, that the men may not lose sight of each other; and that part of the troops do not mistake one defile for another, which may easily happen in the dark, if the advanced guard has marched a little too fast, and the officers hastened too much. The Greeks, according to Xenophon, on like occasions, gave the heaviest arms to the troops that marched at the head, thereby to oblige them to proceed leisurely.

In those marches that are made in sight of the enemy, beside the precautions necessary to be taken for the safety of the troops, and which have already been mentioned, the general should endeavour to deceive them by false appearances, and by an ostentation, often in such circumstances, necessary: as extensive a front as possible should be given to the army; the intervals of the ranks and columns should be widened, but not so as to weaken them; the general should take advantage of an height, possess himself of it, and post some troops on it, in order to make the enemy suspect there may be still more behind: advantage should be taken of a wood, and, by marches and countermarches, the same troops should be made to pass and repass, in order to make the enemy believe the army stronger than it really is. There have been instances of generals, who, on like occasions, have made such good use of their ground, that, by the arrangement of troops, they have seemed to multiply them in the enemy's eyes; and who, although inferior in strength, appearing to have the advantage of numbers, have kept the enemy in awe.

But still, unless it is to deceive the enemy, a general should conceal his force and management: his force, because, if superior, he will not fail to profit by that advantage; and if inferior, he should avoid a battle: he will conceal his management, because he will prevent the designs of the enemy's general, who will receive as much information from his successes as from his miscarriages. Pyrrhus, who taught the art of war to the Romans, was in the end conquered by them. The Mexicans often turned the arts and wiles of Cortez and the Spaniards against them; and the Czar Peter I. never regretted a defeat when it became the means of instructing him how to conquer in his turn.

It is impossible to lay down fixed rules for secret marches: it is by his address that a general will improve circumstances; it is by art and contrivance that he will evade the enemy's vigilance, and deceive his spies.

General rules only can be given for the dispositions to be made of troops upon a march; particular ones would be merely conjectural, because the general of an army must always depend upon circumstances: it is the situation and nature of the country, the number of troops, the nearness of the enemy, the facility of foraging, and the passes of

of which the enemy is possessed, that ought to determine him.

In a word, whatever is the order and disposition of the troops, it must be such, that they shall always be able to sustain each other; that the flanks shall be well guarded, and the fronts secured; the roads must have been surveyed and opened; and whatever the nature of the country is, all the columns should arrive at and enter the camp at the same time.

SECT. VI. *Of Camps in defensive War.*

It is in general more difficult to carry on a defensive than an offensive war, but more particularly so in an open than in a mountainous country. In the former, there is nothing to conceal the movements and dispositions of the army from the enemy; whereas, in the latter, the nature of the places prevents the enemy from discovering them: but whatever may be the nature of the country, the choice of a camp, when on the defensive, and the art of pitching upon an advantageous situation, is what proves the genius and talents of a great officer. Exclusive of a thorough knowledge of the country, this operation requires a quick and penetrating eye in a general, to enable him to seize the posts which from their situation may prevent the enemy either from attacking him or penetrating into the country.

A general who acts on the offensive, takes what state or circumstances he pleases; he may act as he chooses, and is not under a necessity of regulating himself entirely by the enemy's motions: whereas a general that is not sufficiently strong to attack, is commonly obliged to continue quiet till the enemy hath acted, and then to regulate his motions according to those made by the opposite army, unless his superior abilities give him a particular advantage over the enemy's general.

Although it is always necessary for a general to have a thorough knowledge of the country, this knowledge will yet become more necessary to him when acting on the defensive. He ought to prevent the enemy's entering his country, and forming any siege there (a plan which he cannot execute, unless he is possessed of the most advantageous posts, and also of those which cover the towns liable to be threatened), by proper dispositions that secure his camp; by covering his fronts and rears, and keeping the communication between the camp and the places where the magazines are; by endeavouring to annoy the enemy in his convoys and foragings; by harassing him in his camp, and perplexing him with small detachments, to which he will be obliged to oppose more considerable ones: these dispositions, properly managed, may destroy any enterprises the enemy may have formed against the army.

Plate DXVII. represents an army properly encamped to serve these purposes. A, Is the camp of the main body of the army. B, An advanced camp, composed of dragoons and hussars, in order to cover the right of the army, to guard the passés by which the enemy might make incursions upon the flanks and rear of the army, molest the convoys, and cut off the communications. C, Villages and bridges, guarded by the light infantry. D, Posts of dismounted dragoons in the front of their camp. E, Posts of dragoons on horseback, to secure the communication between their camp and that of the main body of the army. F, Bridges built, to keep up the communication between the grand and the advanced camp. G, Bridges and villages guarded by detachments of infantry. H, Grand guards of horse. I, Guards of infantry. K, Bridge, village, and mill, guarded by the infantry belonging to the army. L, Camp of dragoons and hussars covering the left of the army, and sup-

porting the light infantry. M, Villages and bridges guarded by the light infantry. N, Posts of dismounted dragoons in the front and on the flanks of their camp. O, Posts of dragoons on horseback. P, Posts and detachments of hussars, to patrol in the front and upon the flanks of the army, and their camp.

By the enemy's superiority, the nature of the country, and the success of campaigns, the general should determine whether or not his camp should be entrenched: the entrenching of camps requires much observation. It is easy (says Vegetius) to entrench a camp while at a distance from the enemy; but it becomes a very difficult operation when the enemy is near at hand. The Romans, according to him, used to keep all their cavalry and half their infantry drawn up in order of battle, in order to cover those troops that were employed in working at the entrenchments. Cæsar, when in Spain, fortified himself after this manner under the eyes of Atranius and Petreius, without their having the least knowledge of it.

Before a general fortifies a camp in a plain, he must observe the position in which the ground will permit him to form his camp; whether or no it will be liable to be surrounded; if it will entirely cover the country it is to protect, and the towns for which there is most reason to be apprehensive; if the parts in the rear are open; if forage is in plenty; if provision can easily be brought; if there is wood and water; if it is impossible for the enemy to enter the country without forcing the camp; if all these circumstances concur, it is certainly most advantageous to entrench the camp.

A general should never be too secure by having a superiority of numbers; he ought not on that account to neglect fortifying his camp: even when he acts on the offensive, these entrenchments will not hinder him from marching out to the enemy whenever he judges it proper, and his army will by that means be sheltered from the enemy's attempts.

There are many methods of entrenching a camp by lines beginning on the right, and covering the whole front of the camp to the left; these lines, in their extent, have redoubts and angles at proper distances; and the line being continued from one to the other, forms the curtains. In the front of them there is a large and also deep ditch; sometimes a covered way is added, which is palisadoed and stoccaded throughout the whole front of the lines. To render them yet stronger and more difficult to be forced, there are pits sunk before the covered way. These pits are ranged chequered-wise, about six feet deep and five broad, and are in form like a reversed cone. Such were the pits which the duke of Berwick caused to be made in 1734 to the lines of circumvallation before Philippsburg; only with this difference, there was no covered way. Without doubt these lines are formidable, and even very difficult to attack; but a great deal of time is required for constructing them; and if there is not a sufficient number of peasants in the army to work at them, troops must be employed to expedite them; which will not only greatly fatigue them, but may also cost the lives of many; because the removing of earth often causes great disorders, particularly where the ground is swampy or clayey.

The method practised by marshal Saxe seems much superior to these lines. It contained as large an extent of ground, without diminishing the labour; because, instead of lines, it consisted of redoubts, which require as much work to form the four faces and the covered way as lines always continued. At the siege of Maestricht, in 1748, he used these redoubts instead of lines; their distance from each other was 48 yards; they were stoccaded, and the covered

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way pallisadoed. These redoubts presented an angle to the field, and consequently were a mutual protection to each other; they were each of them capable of containing a battalion.

His design, supposing the enemy come to attack the army, was to cause all the redoubts to be occupied; to plant ten pieces of cannon between each, and to draw the army up in order of battle behind them: by this means the enemy would be obliged to force the redoubts before they could attack the army, which could not be done without great loss. But supposing the redoubts to be forced, how would the enemy be able to enter the intervals without dividing? The army behind, in order of battle, would charge him, without giving him time to recover himself, and it is highly probable would beat him.

By following this method of entrenching a camp, if some of the enemy's battalions should, for example, force three or four redoubts, they certainly would not dare to advance as long as the remainder should hold out; so that a general might, by detaching some brigades, and causing them to march to the assistance of the battalions that have been forced, retake the redoubts; or, without disordering the order of battle, drive away the troops which are in possession of them with his cannon. In short, this method seems to be excellent, because it proves that all the redoubts may be forced, and yet the army not be beaten, because it has not suffered in the action, but remained the whole time in order of battle with all its cannon; so that the enemy will be reduced to the necessity of beginning a second battle.—Lines, on the contrary, have not the same advantage; all the troops, or the greatest part of them, must line them; the cannon is planted at proper distances either on the angles of the redans, or those of the redoubts. If one part only is forced, the army is beat, and the cannon taken, because the enemy makes the attack with his whole front.

Lines are indeed never good, unless when there is a large extent of country to be guarded, and some frontier to be covered from the incursions of the enemy; the front of an entrenched camp seldom exceeds six miles, more or less, whereas lines to cover a country have sometimes extended 30 miles in front. By some it is thought, that, in order to cover a country, it is sufficient to have certain holds, which shall be strong and well entrenched, with patrols continually going from one end of the posts to the other, and each post to be provided with signals both for day and night. It is unnecessary that these patrols should be strong, provided they follow, and are continually crossing each other; this will be sufficient to prevent the enemy passing undiscovered. It is certain that the enemy will not dare to pass between these posts, whether he be strong or weak; if he pass in a body, he will be cut off behind, and his convoys intercepted; if he pass only in parties, they will be cut off with the greater ease. However, lines of this nature would require much labour, and also take up years to complete them.

Marshal Saxe's method for entrenching a camp in a woody country interspersed with small plains, seems also to be a very good one. The redoubts are to be erected in the plain; and lines thrown up in the woods according to the usual method, with redans placed on the side of each other, at 24 toises distance; there should be a pallisadoed ditch in the front, and the lines as well as the half-moon should be fringed with pointed stakes; behind these lines, which cannot be very extensive, because they only cover part of the front of the camp, must be placed the troops necessary for defending them; a considerable entrenchment of felled trees must be made behind, with the branches of the trees entangled with each other, and some openings must be left wide e-

nough to permit the troops who guard the lines to pass through, in case they should be overpowered and obliged to retire; the cannon must be planted in the front of these openings; and the remainder of the army must be drawn up in order of battle, 100 paces at most behind the retrenchments of trees and the half-moons. The retrenchments of trees are placed about 60 or 80 paces behind the lines, and not before them, because it will be a new and unexpected obstacle to the enemy. These retrenchments, carefully made, and with large trees, can be destroyed by cannon only, which would take up a considerable time; if they were in the front of the lines there would certainly be a rampart more; but that might be useless, and perhaps hurtful, because the fire of the enemy to make a passage would drive the splinters of the trees into the lines, which would do more harm than even the shot itself.

Plate DXVIII. represents an entrenched camp; in which A is the main body of the army encamped behind its entrenchments. B, The camp of the troops of the reserve. C, Camp of the dragoons, to secure the rear of the army. D, Camp of hussars, to cover the ground upon the right of the army. E, Villages and redoubts guarded by the light infantry, to secure the camp of the hussars. F, Bridges built to secure the communication of the army with the ground upon the right, and to favour the retreat of the troops posted on the opposite side. G, Brigades of artillery distributed upon the flanks, and along the whole front of the army. H, The park of artillery. I, A bridge entrenched, to secure the communication between the army and the ground upon the left. K, Villages and farm-houses, guarded by detachments of hussars and light infantry, to patrol in the front of the army.

In a mountainous country the dispositions for entrenchments are different: it is impossible there to find plains sufficiently large to draw up an army in order of battle, and place it beyond redoubts, as in an open country; the avenues and the passes only can be entrenched; the redoubts would not be sufficient, because not only the avenues must be guarded, but the heights also occupied. Now, as it will often happen among mountains that there is not a foot of earth, how can redoubts be erected there? A general must then make use of such assistance as the country can furnish him with, whether by heaping stones upon each other, or by retrenchments of trees well joined; and thus construct lines sufficiently strong to shelter the soldiers from fire and all injury. In an open country, a general in a manner suits the ground to his dispositions; in a mountainous country, he must apply his dispositions to the ground; but in any country whatever, he must use all the assistance of art for entrenching of camps. In mountainous countries there are more inequalities of ground, which render the enemy's approach to the lines difficult; and altho' it is almost impossible for a camp in a mountainous country to be attacked in front, nothing should be neglected for its safety: but all the avenues by which it may be surrounded must be entrenched with care, and all the heights which overlook it secured; because the enemy, without intending to attack in front, will amuse him during the time necessary for troops to take a long round, in order to penetrate to the camp on another side. If Leonidas, with his 8000 Greeks, had been possessed of all the avenues, ways, and heights, by which he could be cut off, in the same manner as he was of the pass of Thermopylae, Xerxes with his innumerable army could never have forced him in the defiles which he guarded.

The entrenchment should never be more than 250 or 300 toises, which make from 500 to 600 paces, distant from the camp, and which ought to be divided into three parts. This distance should be made, that the troops may be able to

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to judge of the parts that can be carried with greatest ease, and of those which are most in need of assistance, that they may march there with greater order, dispatch, and facility: whereas, if this distance is not observed, it will happen, as hath been sometimes seen, that the troops not having ground sufficient to range themselves in order of battle, the dispositions will be impeded by confusion and disorder, and the enemy will have forced the lines before the troops can be in a condition of opposing him.

But in a mountainous country, it is not sufficient for a general that he cannot be turned; that he hath profited so well by the advantages of ground, as to render the enemy's approach to the camp difficult; that the assistance of art hath been joined to nature; and that the country to be guarded is entirely covered: he must also be careful that the communication with the neighbouring towns where the magazines of war and provision are established, is safe and easy. If any one of these particulars is neglected, the camp is exposed, neither can the general continue in it the time that would be necessary to retard the march and designs of the enemy. As it hath been already observed, that there is scarcely any post that is not liable to be turned or overlooked, the camp should be entrenched only so far as the entrenchments may become an obstacle to the enemy, and as they may be a means of giving the general time to retire to occupy another post.

When the enemy undertakes the siege of some town, and the general, although with an inferior army, is willing to succour it, or cause the siege of it to be raised, he should seek out a spot naturally strong, and entrench it according to its situation: if an open country, according to the method above mentioned; if among mountains, according to the assistance that the nature of the country may give; and make use of these entrenchments as a sure asylum from whence to make sallies upon the enemy, to attack his forages and his convoys, and to oblige him to raise the siege as well by the fatigues of it, when it hath been drawn out to a greater length of time than was designed by the enemy, as by the want to which he is reduced by the continual inquietudes that the entrenched army hath given him.

When an army is in an open country, it generally continues in the same camp for some space of time; because it is certain the enemy cannot conceal his designs so effectually from the general, but he may be able to circumvent them; but in a mountainous country, it is uncertain whether an army will continue in the same post till morning that it occupied over-night. A general must then encamp in such a position, and after such a manner, that in case the enemy comes to attack him in force and with advantage, he may be able, without danger, to proceed to another post, and evade the enemy's designs.

It requires great skill in a general to judge when it is proper or improper to make choice of places which have a great many avenues on one side; because if he should be attacked in a camp inclosed by rocks, or deep in a valley which hath but one or two passes open, it will be very difficult for him to disengage himself from the enemy: on the contrary, if there are many small passes or avenues to the ground of which he is possessed, and by which the enemy may easily invest his camp, it will require a great number of men to guard them. But on these occasions a general should be ever careful to make a good disposition of his troops, to maintain strict order and discipline in his camp, and to send out his patrols with the greatest regularity; by which means he will free himself from all apprehensions of being surprised.

There ought to be no difference between a well-governed town and a well-ordered camp; the exactest order should

be observed, and the strictest discipline kept up: if a soldier is at liberty to quit or enter it at pleasure, the enemy's spies will not fail to make their advantages of it. If the camp is unhealthy, or distressed for provision, water, wood, or forage, and the soldier hath real cause of complaint, every method should be tried to avoid the danger that will attend his being discouraged. It is often owing to the little order existing in the camp, that the soldiers are seized with a panic, occasioned by the absurd and groundless reports that are diffused throughout it; troops thus terrified, are in a manner vanquished before they come to action.

In a mountainous country, such places should be avoided as are subject to be overflowed, either by the melting of the snow, or by torrents, which at some seasons appear no more than trifling rivulets, but which, at others, swell and carry off every thing they meet with in their way: of this nature were those mentioned by M. de Feuquieres, which he found near the rock that he attacked and took in 1690 from the Baduais. Situations in the neighbourhood of woods are generally to be feared, because the enemy may set them on fire, and the flames be communicated to the camp. The general ought also to satisfy himself with regard to the nature of the springs, which may agree very well with the inhabitants, but prove very unwholesome to strangers: such, according to the reports of the French, is the nature of the springs in many parts of Italy. The water belonging to certain streams or rivers will be pernicious, while that belonging to the fountains and wells in the same country will be very wholesome and salutary.

SECT. VII. *Of escorting Convoys.*

THE conducting of convoys is one of the most important and most difficult of all military operations. In the escort assigned them, and the number of horse and foot of which this escort is composed, the general ought to be guided by the distance of the town from whence they set out; the dangers to which they are exposed from the different parties they may meet; the distance and strength of the enemy, and the extent and nature of the country they have to travel over, whether an open or a mountainous one; the number of waggons, and the quality of the convoys, whether they consist of money, or ammunition for war or provision; and whether they are extraordinary or daily. When escorts are too numerous, the troops are fatigued, and no end answered; and when they are too weak, they are liable to be beaten. M. de Puysegur observes, that it is as dangerous to give an escort of 2000 men to a convoy where only 1000 are requisite, as to give but 500 to one where 1000 are absolutely necessary; in the first, the troops are unnecessarily fatigued, and in the second, the convoy is exposed to the danger of being carried off.

All these considerations suppose the general to be a man whose natural parts are matured by experience, and who is sensible that, without a thorough knowledge of the country, the foundation of all conduct, it will be impossible to make a proper disposition of troops. If a general is ignorant of the places most proper to form ambuscades; of those where there are bridges and fords; of the passes which are most dangerous, and those which will favour the enemy's approach in order to attack, and whether in head, flank, or rear—he acts but as chance directs, and his dispositions will have no meaning, either with respect to the situation of places, or the nature of the ground; the orders will be ill executed, the evolutions performed without exactness, and the disposition of the troops will be faulty; the separate bodies being, consequently, unable to sustain and assist each other,

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The general officer commanding the convoy ought, for its security, to distribute his troops after such a manner that they may be a mutual assistance to it. The choice of the troops to form the escort is undetermined, as it is by the nature of the country their quality should be decided. In mountainous and woody countries, only infantry, hussars, or dragoons, can be made use of; the hussars or dragoons are to march in the front and on the flanks, to scour the woods, examine the avenues, and make sure of the defiles; in an open country, the escort should be composed of infantry, cavalry, hussars, or dragoons. But whatever may be the nature of the country, the convoy ought never to advance without first sending out detachments to reconnoitre at a distance.

If the convoy marches through a mountainous country, a large body of cavalry would not only be useless, but also an embarrassment, as it would be unable to act, except with great difficulty; whereas, in an open country, cavalry is very serviceable. In any kind of country a convoy can be escorted with infantry, especially when the enemy can only act with his; but as in an open country it is necessary for the infantry to be supported, the cavalry must be used for that purpose. In a mountainous country, infantry can carry on war alone.

In this last case the officer commanding the escort ought to place a body of infantry at the head, another in the centre, and a third at the rear-guard; to distribute small bodies at proper distances on the right and left; and he should be particularly careful to possess himself of the heights. The hussars must be distributed to the advanced and rear-guards, and, in order to be more certain that every part hath been strictly examined, as the convoy advances, notwithstanding the hussars of the advanced guard have already scoured the avenues, woods, valleys, villages, and hollows, the hussars belonging to the rear-guard should again look into those places, to see whether any thing hath escaped the notice of the advanced guard. These precautions are never without their use, and do not in the least retard the march of the convoy.

The small detachments should advance as far as possible into the country, without exposing themselves to the danger of being cut off, the hussars with pistol or musketoon, and the dragoons with their carbine in hand, in order that, if they should meet the enemy, they may, by firing, give the officer commanding the escort notice of it, so that he may have time to make his dispositions for defending and preserving the convoy. The convoy may continue marching on till the enemy is discovered: but on the first notice of him, it must stop, and the officers belonging to the convoy should park their waggons; or, if the ground will not admit of that, they should cause them to keep very close together, and double them up with the distance of four paces, which should be filled with infantry, between each waggon. By this movement the length of ground taken up by the waggons will be contracted, the troops will be brought closer together, and will form a stronger and heavier body, capable of assisting each other with more ease.

In a mountainous country it is almost impossible for the enemy to attack the advanced and rear guards and the centre at the same time. Nevertheless, if he should find an opportunity of forming these three attacks at once, by following the dispositions above mentioned, he will find troops at every part to receive him: neither will he be able to make himself master of the heights without attacking them, and the troops already in possession of the ground will easily repulse him; and by the assistance which the officer commanding the es-

cort should endeavour to send them, they will be enabled to maintain themselves in them, to protect the convoy, and the enemy will be unable to attack by more than one or two passes.

If the enemy forms but one attack, only a part of the troops must be opposed to him, because it is to be supposed this attack may be made only with a design to draw the whole strength of the detachment to that part, and which, by being altogether in that one place, will give the enemy concealed in ambush an opportunity of falling with ease upon that part of the convoy that is unprovided with troops, and which will of course be incapable of making any defence. The troops of the centre should never march to the assistance of the advanced guard, if it is that which is attacked, nor those of the rear-guard to the assistance of the centre; but a party from those troops which cover the flanks of the convoy should be collected in a body, and sent to assist the part that is attacked. However narrow and confined the country may be, a convoy may be easily conducted by infantry, when it would be impossible to do it with cavalry.

When any pass or avenue crosses the road on which the convoy marches, it should be covered by a body of infantry, which will remain there till the rear-guard is come up; then it will fall into the post assigned it for conducting the convoy. It is always to be supposed, that this pass hath been examined by the advanced detachments. If the escort is composed of infantry and dragoons, the latter should be dismounted, in order to give an additional strength to the guards, and their horses may be tied to the waggons. The hussars, if the nature of the country renders them unserviceable on horseback, may also be dismounted; by which means, instead of being an embarrassment to the infantry, they will become useful to it. The nature of hussars is such as will admit of their being employed on every occasion; and although the difference of their arms will not permit them to be as serviceable as dragoons, they may nevertheless amuse a party of troops belonging to the enemy in such a manner as to enable the infantry to beat them, or at least to oblige them to retire.

Hussars are more particularly necessary in the escorting of convoys, because they scamper about on all sides, and are very active and ready in scouring a country thoroughly; they leave no place till they have perfectly examined it, unless the thickness of the woods, or any other unavoidable obstacle, should prevent their penetrating as far as they would otherwise do; and even then they protect the infantry, who can with greater ease pass into those places where the hussars cannot. Whatever country the convoy passes through, there should always be hussars with it; otherwise the officer commanding the escort cannot be certain that the country is thoroughly surveyed, because for want of hussars he must employ cavalry on that service. Not that there can be any doubt of the cavalry's exposing itself to danger with as much cheerfulness and courage as the hussars; but as the horses belonging to the cavalry are naturally heavier than those of the hussars, and often encumbered with forage, they cannot venture to a proper distance without running the danger of being taken, because they cannot retire with that expedition which is requisite: On the other hand, the hussar being more active, and more accustomed to reconnoitre, knows how to go over a country with proper caution and care to himself: besides, the trooper who is used always to march in a body, and to be under command, will have a very imperfect idea of the method of scouring a country. Although the disposition of the troops should always be regulated by the nature of the country through which the convoy marches, and by the nature and

number of the enemy by which it is liable to be attacked, yet the general should never neglect, whatever his situation may be, to secure the head, centre, and rear. Before the convoy begins its march, the disposition in case of an attack should be settled; by which means the commanding officers of different corps will know where to post themselves, and after what manner to act at the time the attack is made. By the knowledge which the commanding officer ought to have of the country, he will form a judgment of those places where it is most probable he may be attacked, and of course make his dispositions accordingly. In any disposition that may happen, a general should always foresee in what manner the attack, defence, and retreat, will be conducted.

When a convoy marches through an open country, the advanced and rear guards should consist of cavalry sustained by infantry; the infantry in the centre should be continued on the right and left of the waggons, and the cavalry divided into troops should be distributed on the flanks, at 100 or 150 paces from the infantry; squadrons of horse, intermixed with platoons of infantry, should be placed at proper distances on the flanks of the remaining part of the convoy. By this position, if the convoy should be attacked in head, centre, or rear, these squadrons and platoons should have orders to march immediately to the assistance of the party that is attacked.

The advanced detachments of hussars, and those upon the flanks, by giving notice that the enemy is at hand and coming to attack, will furnish time for parking the waggons and uniting the troops; in which case the infantry must form in the park, and the cavalry post itself on the flank of that front which expects to be attacked, and the hussars place themselves upon the flanks of the cavalry.

The attack of a convoy is always sudden and rapid, and the success of it is generally decided in the first onset; and as the enemy, whether he succeeds in his attempt or not, must retire with great expedition, for fear of any succour that may arrive, it is evident that it can be attacked only by cavalry, hussars, or dragoons; there have indeed been some instances where the cavalry have brought infantry behind them. If the convoy has had time to park itself, the effort of the infantry can only be turned against that which it intrenched behind the waggons. The enemy's cavalry and that belonging to the escort attacking each other, will fight upon equal terms: but with regard to the infantry, it will be different; that which is sheltered by the carriages having a great advantage over that which attacks it. On the contrary, if the enemy's infantry is sustained by hussars only, they will be briskly attacked by the cavalry and hussars belonging to the escort, who will take them in flank and rear. The enemy's hussars being hemmed in, his infantry, for want of being sustained, will be easily beaten: part of the cavalry and hussars belonging to the escort should be left in pursuit of the enemy's hussars, and the remainder ought to take his infantry in flank. If the enemy is beaten, as it is probable he will, his retreat seems impracticable, or at best very difficult; because, being deprived of his cavalry, he will be forced to make head against the infantry that attacks him in front, and to repulse the cavalry that harasses him in flank.

If the enemy gives ground, the general should be cautious of pursuing him too far, lest, if he should receive a reinforcement, the troops in pursuit of him, finding themselves at too great a distance, will not only be beat, but also be deprived of every method of retreating.

There are some occasions on which the enemy must not be pursued at all; such as when the armies are very close to each other, or the convoy draws near to some of the ene-

my's posts; because then, by the nearness of the army, the enemy's infantry can come to the attack without being under the necessity of mounting behind the cavalry. A general, to whose care a convoy is intrusted, should never seek any other advantage than the conducting it in safety, even though he should be sure of beating and taking a detachment belonging to the enemy; a real advantage is often given up by endeavouring to follow an uncertain victory. There is less shame in being beat, when an officer hath done his utmost, and acted with propriety, than there is glory acquired in conquering when he hath exceeded the limits of his duty. An officer is no longer praise-worthy, than whilst he acts up to the orders he hath received with exactness and discretion; whereas he who, depending too much on his own courage, rashly suffers himself to be drawn on by the appearance of success, is not only charged with, but ought to be answerable for, the consequences.

There still remains another disposition to be made in an open country, whether the convoy marches on a causeway or in the high road, which is to divide the escort into many equal parts, with troops of every sort belonging to each; the first body should set out an hour before the convoy is to begin its march, the second half an hour after, with orders to the commanding officers to scour the adjacent country with great exactness, and to be careful not to be cut off by any detachments the enemy may have in the country; for which reason these two bodies should never be more than three quarters of a league distant from each other, by which means they will be within reach of assisting each other. The body which sets out last should never be more than half a league before the advanced guard of the escort.

As the convoy is supposed to march through an open country, the above-mentioned distances are allotted between the first and second bodies, and between the second body and the advanced guard of the convoy; but if the country should grow rough and unequal, these bodies should draw closer together, and always keep sight of each other, so as to be able to assist one another in case of an attack.

When these bodies are set out, the general must put the convoy in motion, and form the advanced guard of one of the divided detachments belonging to the escort; the infantry of which detachment will remain at the head of the waggons, the cavalry shall march by troops 300 paces in advance, and the rear-guard must be formed equal to the advanced; but besides this rear-guard, there should be a body of hussars and dragoons reserved, to march a quarter of a league or more, according to the nature of the country, in the rear of the convoy; the remainder of the infantry shall be distributed at proper distances on the sides of the convoy, and the remainder of the cavalry shall be placed on the flanks of the convoy, about 300 paces distance.

When a convoy happens to be of such importance that its being taken may influence the operations during the remainder of the campaign, the general should not only assign a stronger or more numerous escort to it, but should also send off detachments, which, without having orders to attack the enemy, should keep between him and the road that the convoy keeps, in order to oppose and baffle any designs the enemy may have formed to carry it off. The following examples will show both the security and necessity of this method.

During the campaign of 1746, marshal Saxe, being encamped on the Orne, was in expectation of a considerable convoy from Judoigne. As its safe arrival in the camp was of great consequence, he caused the marquis of d'Armentieres, then major-general, to set out with a large detachment in the night preceding the day on which the convoy

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was to begin its march, with orders to march on the side of Ramillies. At the same time, he caused another detachment to set out from the camp of his serene highness the prince of Clermont, with orders to march on the side of the abbey of Rame: these two detachments, by amusing the enemy on one side, and by entirely concealing the march of the convoy on the other, enabled it to proceed in security, and it arrived in the camp without having been at all molested.

In the beginning of the campaign in 1748, the same general having a design to lay siege to Maestricht, and consequently having occasion for all his troops, was willing to throw a supply of provisions into Bergen-op-Zoom, as he was going to a distance from that place, and could no longer be in a situation of assisting it. For that purpose he ordered a considerable convoy, which set out from Antwerp for that town under a good escort; but in order to prevent an attack, which circumstance had often happened during the winter, and that with loss, the allies at that time occupying a chain of quarters from Breda as far as Voude, he detached the count d'Estrees with a considerable body of cavalry to march on the side of Breda, with orders to push on detachments almost to Voude. This detachment had two objects in view; one of which was to keep the allies in suspense with regard to the siege that was to be formed, and the other to cause them to remain near Breda. This large body of cavalry kept the allies, who were in the neighbourhood of that town, in suspense; during which interval marshal Saxe marched to Maestricht, the allies not daring to attack the convoy, because they would have put themselves between the escort and the troops under count d'Estrees. From these two examples may be concluded the necessity of covering convoys of importance by detachments, independent of the escort assigned them. In short, a general should do every thing that will contribute to the security of his dispositions; and precautions ought never to be thought superfluous when they are managed with prudence, and have for their end the success of a well-concerted plan.

SECT. VIII. *Of Detachments for forming a Chain of green Forage.*

It is very difficult to provide a large army with forage; and a general often exposes it to inevitable danger, if he is not thoroughly experienced in this operation, or if he is destitute of that knowledge which at once presents all the wants of an army, and the means of supplying them, to his view.

Foraging parties, like convoys, are attended with a greater or lesser degree of danger, according as the country is more or less accessible, and the forage at a distance or near at hand. The disposition for the chain in an open country is different from what it must be in a mountainous one. When forage is within reach of the camp, and the enemy at a distance, fewer troops and attendants are required; because, in case of an attack, there is assistance near at hand: but in proportion as the forage is farther from the camp and nearer to the enemy, the precautions should be increased, and more troops should be allotted to the chain, which should also sometimes be furnished with cannon.

A general should never forget that maxim which says, 'The enemy must always be opposed by troops of the same nature as those with which he makes the attack: if the forage, therefore, is in an open country, the chain, as it is certain the enemy will be more numerous in cavalry than infantry, should consist chiefly of cavalry, and only have

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infantry sufficient to occupy such posts as are necessary to be guarded: in a mountainous country the dispositions will be quite different; because, as it is impossible for cavalry to move easily, the chain should be strongest in infantry. In short, the number and quality of the troops for the chain should be regulated in the same manner as in regard to the convoys; in proportion to the nearness or distance of the enemy; by the extent of ground to be foraged; and by the nature of the country: and as marshal Puysegur observes, before the ground to be foraged is examined, there should be a calculation made of the number of horses to be fed, and of the fertility of the ground that is to be foraged; for if it is a plentiful spot, a less extent will be sufficient; if it is not plentiful, a larger must be taken; but in either case the chain must be always proportionable.

Before a forage is undertaken, the ground on which it is to be performed should be always thoroughly known; in order for which the general should send out in the evening, or the day before, the officer who is to command it, with a detachment, to survey the situation of the country; the places where he must post his troops of cavalry and dragoons; the posts which the infantry must occupy; the ground necessary for the foragers; that where the corps of reserve must be posted; and what part in the front of the chain it will be necessary for the hussars to scour. After having examined all these particulars, the officer makes his report to the general, who, from the account given him, will order the troops necessary to secure the forage, and render the execution of it easy. The chain of forage should be in proportion to the number of troops that are to forage, as well as to the quantity of sown fields and the thickness of the grain. Besides the horse, dragoons, and infantry, there should be hussars to scour the country in the front of the chain: the number of them is undetermined, as it will be sufficient for them to cover and protect the front, and give the commanding officer immediate notice of every thing that makes its appearance.

If the forage is to be made at a distance from the camp, the troops destined for the chain should set out at day-break, or the evening of the foregoing night. The commanding officer must take care to establish the chain before the foragers arrive, and also that the hussars have scoured the country; first, because the foragers should not, by waiting, fatigue the horses; and secondly, that no trooper or servant shall pass; which will undoubtedly be the case if there is any vacancy where troops are not placed.

The whole of the troops should be disposed after such a manner as to be able to see one another; and the vedets also, that are placed between the troops to prevent the foragers from passing, should be within hearing. The infantry should be posted in hollows and villages and behind hedges, with horse or dragoons to sustain it and support the flanks; and the disposition of the chain will be still better, if these troops can be mixed with it, provided the infantry can be sheltered by any hollows, hedges, or bushes.

Grenadiers, sustained by horse and cannon, if there are any, should be posted on those sides which, either from the situation of the country or the nearness of the enemy, are most liable to be attacked: but in reinforcing these posts, the commanding officer must be careful not to weaken the chain too much in any particular part. When an enemy attacks a foraging party, he generally attempts to penetrate at different parts; but if he forms only one attack, the disposition of the chain becomes useless, as all the troops must be brought to that part where the attack is made. But as it is naturally to be supposed the enemy will form many attacks, particularly if his general acts like a man understanding

understanding his business, he must be strong in every part; the reserve, which is in the centre, will, with expedition and speed, send assistance to the parts which are attacked.

Before the commanding officer fixes the chain, he should detach some hussars to survey and scour with great exactness the woods, villages, hollows, and all such places, for at least three quarters of a league or a league, in front, as may be capable of containing ambuscades: and during the time of this surveying, the troops destined for the chain will remain in order of battle, in the front of the ground that is to be foraged, in order to cover it and protect the hussars, in case they should be attacked.

When this examination is finished, the commanding officer may begin to establish his chain, and the hussars will remain in the front till the foraging is finished; and will detach small bodies to march round about the chain, crossing each other, halting at times, and sending some hussars before them to patrol.

If the hussars gain intelligence of the enemy's being either in march, or placed in ambuscade, they will send immediate notice of it to the commanding officer of the chain, who should always fix himself in a particular spot, that there may be no time spent in seeking him; his post should be in the rear of that part of the chain that is nearest to and most in front of the enemy, and he will regulate the dispositions for his defence according to the report made to him. When an ambuscade is discovered, and troops marching to attack, a general should always suspect there may be more ambuscades, and more troops in march, to form different attacks; he must therefore, instead of weakening the chain in any part, strengthen it as much as he can, by causing either the whole reserve, or part of it, to march where circumstances shall require.

The avenues and the heights in a mountainous country should be occupied by infantry; the avenues, in order to prevent the enemy from penetrating into the valley or plain where the forage is made; the heights, in order to observe the enemy at a distance, and to prevent his getting possession of them, and flanking the troops which guard the avenues. In this case there should be a greater number of infantry than cavalry; no more of the latter being requisite than what is necessary to sustain and support the infantry, in case it should be attacked, repulsed, and obliged to retire through a valley or plain. Then, if it hath no cavalry to support it, the wings will be entirely exposed, and the enemy being superior, can at the same time attack the front and the flanks; whereas, by the means of horse, which can act with ease in a plain or a valley, this inconvenience will be prevented, and the infantry greatly assisted.

If the forage is made at a distance from the camp, and in the neighbourhood of the enemy, the infantry guarding the avenues should throw up some entrenchments in its front, which will be soon done; and it is then cannon becomes necessary, as there should be two or three pieces planted at each avenue. The heights also must, on every occasion, be occupied, which should be constantly observed as a general rule, whether the enemy is at a distance or near at hand, in every disposition that is to be executed in a mountainous country.

If the enemy forms one or more attacks, the small escorts belonging to each regiment must join on the first order, and cover the foragers as much as possible, who should at the same time assemble in the centre by regiments. The foragers should always be provided with their carbine or sword; and although they may not be very formidable against troops completely armed, yet there have been instances where they have charged with success.

If it is in a plain, and the enemy, having formed but one

attack, charges the chain in one particular part, the troops of horse and dragoons which are opposite to him should march up resolutely and sustain his efforts: if they are repulsed, they will be supported by the infantry that hath remained in its post; the hussars which were in front will unite, and place themselves upon the flanks of the troops which are attacked, in order to cover them, and endeavour to defeat the enemy by charging him in flank and rear. If the general is certain that the whole of the enemy's troops are engaged in this one attack, he may then bring up all the troops belonging to the chain, both cavalry and infantry, in order to oblige him to retire the sooner: which if he does, some hussars, sustained by horse and dragoons, should be sent in pursuit of him, till his retreat becomes certain; but with caution not to pursue too far, lest he should rally upon those troops, who, being too far from the chain, cannot receive assistance so soon as would be necessary; and besides, the making and accomplishing the forage being the grand object, the commanding officer should be contented with succeeding in that, without seeking for any other advantage unconnected with the original destination of the troops.

If the enemy forms more attacks than one, the foragers, who, as hath been already observed, must be assembled in the centre, should have orders to take the road to the camp, and will re-enter it covered by the small escorts from the rear-guard: but as a forage should never be abandoned till the last extremity, they should be ordered to draw up in order of battle, when they are within a quarter of a league of the camp, in order to return and complete the forage on the first order. But if the enemy is in force, and by his superiority all hope of obtaining the forage is destroyed; or if it is made at so great a distance from the camp that the troops belonging to the chain cannot expect to be readily assisted; the commanding officer ought to make a retreat, with every disposition a good officer is capable of, and to join courage and vigilance with knowledge and experience.

If, on the contrary, the enemy is weaker, or of equal force with the chain, he should be charged without hesitation; because the enemy, regulating his attack by his defence, will be obliged to contract himself, in order to make his attack heavier and more considerable; so that the troops being united, will charge the enemy: and if, by the assistance of the hussars who are advanced, and act after the manner already mentioned, the enemy is forced to retire, he must be pursued in the manner above directed; after which the troops must return and complete the forage.

As a commanding officer is, in case of a forced retreat after being beat, obliged to submit to circumstances, and regulate his dispositions by the enemy's, he must retire with the greatest order possible, causing the infantry to march in the centre, either in columns or in order of battle, as the situation of the ground will best allow; the horse and dragoons upon the wings, the hussars upon the flanks, that they may not confuse the dispositions, but serve as a support for the chain, and prevent its being taken in flank; and the disposition of the troops should be so managed, that the enemy shall not be able to present a larger front than that which is opposed to him: and although it is impossible for a general to foresee, for certain, what will be the dispositions for an attack and retreat, because they must be changed according as those of the enemy alter, or as the nature of the ground varies; they should nevertheless be so ordered, that each body shall be supported, and capable of acting without confusion. It is only on occasions thus pressing, that the commanding officer should suffer the forage to be abandoned; and even then it will be some satisfaction that he hath been able to place the foragers and their horses in a state of security.

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If, during the retreat of the chain, it should receive assistance from the army, it should charge the enemy, notwithstanding its being too late to go on with the foraging; and if this charge should prove successful in either beating or causing the enemy to retire, he should be pursued without intermission, in order to deprive him of all desire for repeating the attack. In order to improve this advantage to the utmost, the commanding officer should leave a large detachment, consisting of infantry, cavalry, dragoons, and hussars, to continue all night upon the spot, and the next morning betimes, the foragers, properly escorted, will come to take away the forage; and as soon as the escort is arrived in the front of the chain, the detachment which hath remained there all night must return to the camp.

There still remain many other precautions to be taken for the security of foraging parties, but the limits prescribed to us will not admit of our stating them. We shall only add, that the foragers, in entering the ground they are to encompass, do not occupy more than is absolutely requisite, and that they do not spoil more grain than they carry away with them; first, because by extending the chain it would be weakened, and become easier to be forced; and in the second place, every prudent officer should be an economist in the article of forage; the officers commanding the small escorts which march at the head of each regiment should be charged with the care of this. These officers will cause their troops to march as much as possible through roads and over grounds which are untilled, till they arrive at the place intended to be foraged. If all the grounds are sown, the commanding officer must cause the cavalry to dismount at the place where the chain halts, and part of the troopers furnished with scythes must go and cut the grain, while the remainder hold the horses; and when there shall be no farther room to fear damaging the forage, the cavalry will remount and take it up. Each place should be marked out for a brigade or a regiment; which distribution should be made by the staff-officers before the troops arrive.

SECT. IX. *Of the Detachments for forming a Chain of dry Forage.*

If there is great exactness and knowledge required in the conducting of parties for green forage, those for dry forage perhaps require more; and, in general, every thing that regards foraging parties, whether green or dry, excites a particular attention in the commander in chief; and, according to the chevalier Folard, all success in war depends upon secrecy, diligence, activity, and the thorough knowledge of the country.

The dispositions for forming a chain of dry forage, which differ from those for forming one of green, will direct the means for extending the chain in proportion to its strength, and at the same time place the foragers in security; although, in parties of dry forage, the foragers generally take up less ground, according to the distance of the villages that are to be foraged from each other.

The dispositions for a chain of dry forage are also varied according to the nature of the country; but whether it be open or mountainous, each different body should be placed in that part where it can act with the greatest facility; the infantry therefore should occupy the villages, and the cavalry the plain in front, and should be disposed after such a manner as to be able to retire easily to the protection of the infantry. Before the foraging is put in execution, the commander in chief should mark out the villages to the general officer who is to command the foraging party, and regulate their number by the quantity of troops that are to forage. The first dispositions will be the same with those mentioned

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in the foregoing section in relation to green forage: therefore the general who is to command the forage ought to set out with a detachment in order to examine the ground, the posts necessary to be occupied, the villages which are to be foraged, their situation, the rivers which cover or run through them, the bridges to be guarded, the distance from one village to another, and with what degree of ease the communication with them may be secured. After having thoroughly examined into these particulars, he can with ease form a judgment of the number of troops that will be necessary to form the chain and secure the foragers; after having done this, he will order the bailiff or burgomaster of every village to come to him, and inquire of them the number of husbandmen, and how many ploughs each husbandman hath belonging to him; by which he will be able to calculate the number of sheafs reaped by each husbandman.

The general may, for every plough, reckon about 30 acres of ground; and, in proportion to the fertility of the ground, every acre will produce from 120 to 160 sheafs: by this method may be computed the number of sheafs reaped by an husbandman who hath three or four ploughs; and from this calculation the general will judge whether the number of sheafs, supposed to be in each village, will be sufficient for the troops coming to them.

Let every acre of ground be supposed to yield 144 sheafs; then a husbandman who hath three ploughs will have reaped 12,960 sheafs; so by reckoning 12 sheafs to a truss, and every truss to weigh 600 pounds weight, this husbandman will supply sufficient for 124 trusses. It is true, that some deduction should be made from the number of trusses that every acre may yield, as the husbandman or farmer may have preserved or consumed some either for daily use or for feed.

It is very necessary that the general should take care to leave sufficient grain, not only to enable the husbandman to live, but also to sow his grounds; particularly if he foresees a probability of the next campaign being carried on in the same country.

Nevertheless, as this manner of reckoning may be attended with inconveniences, because there are some villages which keep up a particular trade of forage and grain, and therefore the granaries and barns may sometimes be found empty, yet the quantity of sheafs and grain remaining in the village may be calculated by the number of inhabitants to be subsisted. Marshal de Puyfégu's method, which consists in informing himself of the number of horned cattle and horses, and by deducting the time they graze, is a very good one; but still there must be some deficiency in this calculation, as it will be impossible to fix with certainty the time of their grazing.

When the general shall have arrived at a tolerable certainty of the quantity of forage; the ground where to establish his chain; the posts which the infantry are to occupy; and taken a note of the quantity of forage; he will carry away one or two of the bailiffs or burgomasters, as hostages for the security of the forage: he will also direct them to inform the inhabitants, that if they conceal or purloin but even a single sheaf from the whole, he will cause their village to be first pillaged, and afterwards set on fire; so that the peasants, on whom these threats have often great effect, will scarcely give the enemy information of the intended forage. The general must leave some companies of infantry, sustained by a detachment of hussars in every village, who, by constantly patrolling on the outskirts, will stop all comers and goers; while the infantry will keep a strict guard on the inside of the village, and permit no person to go out of it; nor suffer the bells to be rung, colours

colours to be hoisted upon the steeple, or fires to be lighted; and will put a stop to every thing that may be supposed to be a signal agreed on with the enemy. When the general hath completed all these dispositions, he will return and give an account of them to the commander in chief.

The same general shall, upon the day appointed for the forage, set out at day-break, with the troops destined for the chain, and the staff-officers. As soon as he shall be got within sight of the villages, he will not fail to have them examined, notwithstanding he left troops in them the foregoing evening. When they are all examined, he will leave them in the rear, march on into the front, and draw up in order of battle; after that, he will form the chain, regulating the dispositions of it by the situation of the ground, and of the villages examined over-night. The hussars will advance three quarters of a league or a league, in order to scour the country; during which time the staff-officers, instructed by the general of the quantity of sheafs contained in each village, will, attended by the bailiffs or burgomasters, make a distribution of the forage by regiment or brigade, and assign a barn to each, or one to two. When this distribution is made, the staff-officers will make a report of it to the general commanding the party.

As all the villages marked out to be foraged are not in the same line, those which are in the rear, and covered by others in which there is infantry, and by the chain of horse and dragoons in the front, require but a small number of troops; and if a detachment of infantry is posted in

them, it is more with a view of preventing the troopers and servants from marauding than any thing else.

The escort belonging to each regiment, commanded by a captain, should remain upon the spot where the regiment forages, and, with the assistance of the infantry, prevent disorder among the foragers, and send off those who are loaded. As soon as a regiment is set off, the captain commanding the small escort must report it to the general officer commanding the forage; after which he will follow, and form the rear-guard of it.

As soon as the general shall be apprised by the staff-officers, and the captains commanding the small escorts, that a village is evacuated, he may contract his chain, and draw it nearer together, till the foragers are gone; which when they are, he will assemble his troops, and detach as many platoons of infantry as there are villages: or rather the body of infantry posted in each village during the forage, should leave a party to make a strict search after all stragglers and marauders; the first they should keep with them, and make the others prisoners, and punish them severely on their return to the camp. When all the different bodies shall be re-assembled, and the officers commanding them have made the report, the general will order the hussars to be called in, and form a rear-guard according to the manner directed in the foregoing section, and return to the camp in the same order, and with the same dispositions, as if he expected to be attacked.

PART II. Of the OPERATIONS of OFFENSIVE WAR.

JUSTICE and humanity having been considered, in this article, as the first principles of war, the chief intention of the first part hath therefore been, rather to convey maxims for a just defence, than to lay down rules for attacking. But though defensive war be that alone to which religion and philosophy give their sanction, it does not follow that a nation is bound to wait patiently for the attack of its enemies. When the conduct of other nations is such as evidently to show that they meditate a war, the nation threatened may arm itself, and strike the first blow when it can be struck with advantage. There is only one precaution for avoiding the danger with which it is beset. By observing the various operations of an offensive war, it may indeed be often seen that the whole is nothing more than a series of defence, and that the fear of being attacked is the real source whence these precautions for attacking spring.

SECT. I. Of Spies.

It is impossible for a general, or even for an officer charged with the command of a detachment, to act with certainty if he have not spies or secret intelligence dispersed about the enemy's army; for, without the information which they alone can give, he will have the mortification to see all his designs miscarry, and all his precautions become useless, because improperly taken.

No expence therefore should be spared to procure intelligent spies; but care should be taken that they are unacquainted with each other, and particularly that they are not known to any inferior officer: they should be always spoken to alone, and never be suffered to meet each other. The general should study their character, and prove them by repeated trials; he should sound them by degrees, beginning with things not difficult to be explained, and which, if discovered, will not be of great consequence; he should engage them in long conversations, thereby to form a judge-

ment of their parts and comprehension; and he should also employ them often in bringing him intelligence.

Although a general should always be upon his guard with a spy whom he hath cause to suspect of treachery, he may nevertheless draw great advantage from him, provided he knows how to deceive him properly; because he may be very certain he will inform the enemy of all the resolutions which have been taken.

The emperor Leo, in his *Tactic*, advises a general, who hath reason to imagine his counsels are betrayed to the enemy, to conceal his real designs, by speaking in a manner quite opposite to them: For, says he, in the maxims at the end of his book, an enemy must be deceived who receives intelligence from spies or deserters directly contrary to what is actually resolved upon. But, adds he, should these spies be entrusted with the general's real intention, he should, by some alteration in his operations, endeavour to persuade the enemy that they have deceived him; upon which he will grow mistrustful of them, and be obliged to look out for others, no longer daring to confide in the former.

If a spy employed by the enemy is discovered, and brought to the general, he ought to take him in private, question with mildness, speak to him with a sort of confidence, and, instead of threatening, should promise him a reward if he will discover to him what he knows of the enemy's intentions. If the general finds him intelligent, he should endeavour to engage him in his service; and, provided he can gain him over by force of money, a thing not difficult, he may derive great advantage from him; but he should be careful how he employs him, till he hath very good reason to be assured of his fidelity.

There are many different methods of trying the veracity of a spy: if, for example, the general receives information, that, on such a day, a detachment of the enemy is to set out on some expedition, he should then send out troops to double the number of those detached by the enemy; by

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which means, if the spy's intelligence is true, the enemy will not only be balked in his design, but may also be beat by the superior detachment. If the enemy's detachment has but a trifling object in view, it will be sufficient to send just troops sufficient to examine into the truth of the spy's report. The general may also pretend to appoint a foraging within two days, and order but few troops for the chain; in which interval, if the spy is false, he will find an opportunity of giving the enemy notice of it: but, instead of the few troops publicly ordered, the general will privately add another body to them, which will be placed in ambuscade behind the place where the pretended forage is to be made. If the enemy, in consequence of this information, should come and attack the chain, it should immediately retire, as if too inferior in number to continue the forage, toward the troops in ambuscade; when, being joined, they will fall upon the enemy on all sides. If this attack is made with vivacity and resolution, there may be great reason to expect it will terminate in a complete victory.

If, on the contrary, the spy does not appear intelligent, or affects stupidity, the general should punish him with death, and cause him to be hanged in the sight of the whole army, in order to deter others, which may be dispersed in the camp, by his fate. It would be needless to question him concerning the enemy, because it would appear inhuman to execute a man who had given intelligence of importance, whether extorted from him by fear, force, or perhaps a promise of pardon.

Spies are as necessary to a general as arms are to an army: but it is money only that can secure their fidelity; and if a general finds himself ill served, it is because he has been too sparing of the funds intended by his sovereign for that purpose. Notwithstanding it is the duty of a good subject to manage his master's finances as much as it is in his power, yet there are intelligences of so great importance, that it is scarcely possible to pay sufficiently for them. A man is sufficiently indemnified when, by means of the intelligence he has received, he has concerted his measures in such a manner as to beat the enemy, gain some marches over him, or to be beforehand with him in some enterprise.

Spies, when discovered, should not always be punished with death; great advantage may be made of them by pretending ignorance of their real quality, especially if they are not sufficiently disguised. Tacitus, in his *Annals*, says, that Vitellius's party got information of Otho's designs by means of his spies, who, by endeavouring to dive too minutely into their enemy's secrets, did not sufficiently conceal their own. Vegetius's method for discovering spies who are suspected to be ranging about in a camp, is to order all the soldiers and servants into their tents during the day, and the spies will be taken immediately.

When a general is ignorant of the enemy's designs he should always affect a knowledge of them; but whenever he is informed of them, he should, on the contrary, pretend to be ignorant of them; by which means the enemy, being easy with regard to his spies, will not alter his designs, or suspect the general of having any knowledge of them.

If the general can procure such spies as, by their employment, are near the person of the enemy's general; as, for example, a secretary, or any others who are near him, and who consequently can give intelligence more to be relied upon than those who are constantly passing from one army to another; their service may be turned to a very great account.

If a general discovers an enemy's spy to be one of those who, by their employment, are near his person, he can receive great advantage, by forcing him to write a letter of false intelligence, thereby to divert the enemy's attention

from the plan he would execute; but he should cause him to be hanged immediately after, for it would be very imprudent to use him above once. The prince of Orange, when he came to attack M. Luxemburg at Steinkirk, having discovered one of his musicians who gave the enemy intelligence of every thing he intended, made use of this stratagem; and although it was rendered abortive by the vigilance of M. de Luxemburg, and the courage of his troops, there are nevertheless but very few instances where it hath failed: and even M. de Luxemburg would have been beaten, if he had not had early notice given him by his advanced detachments; by which means he had time sufficient to make his dispositions, and to avoid being surprised.

There is a stratagem which may be made use of when spies are wanting, and which is less expensive; that is, to send supposititious letters by the first peasant that comes in the way, who will have nothing to fear; and so far from concealing himself, he must take a road where he will be sure of falling into the enemy's hands: these letters should be directed to the general officers commanding a body of troops, or even to the general of the army, supposing they come from an advanced body. They should contain schemes that are good, and practicable in their execution, but quite opposite to what is intended and will really be undertaken: it often happens that the enemy, too credulous, abandons his original designs to pursue chimerical ones, which to him appear very good, and do not present any obstacle to those which the general designs to execute. Prince Eugene succeeded, by this stratagem, in raising the siege of Coni, formed by the French in 1691.

But nevertheless a general should take care that, through a fear of being deceived by supposititious letters, he does not himself too much neglect the intimations which are given him: a general ought, says Onozander, to listen to every body at all times, and upon all occasions. Alexander, when at a great distance from his own country, not being able to receive his couriers till very late, refused to give attention to a peasant, who came to inform him of a shorter route; but soon repenting of what he had done, he sent to seek after him, but in vain.

The same reason that should make a general always have spies in the enemy's army, should also make him suspect that the enemy has some in his; therefore he should endeavour to deceive them, he should keep his intentions secret, mention them to very few, and always talk openly, contrary to what is really designed. Onozander observes, that it shows great folly in a general to mention his designs publicly, especially when they are on the eve of execution; for deserters generally go over to the enemy at the time an action is unavoidable.

But if it is discovered that the enemy has received information, Vegetius says, that the dispositions must be immediately changed. Polybius, on like occasions, particularly recommends silence and dissimulation; he even stretches this rule as far as the thoughts themselves, which he says must sometimes be repressed, for fear our actions should sometimes betray and discover them. Metellus answered one of his friends, who, on an important occasion, asked him the reason of certain dispositions, "that if his shirt knew what he thought, he would burn it."

To avoid the danger of treachery, sealed orders have been used with great success, which have been sent to officers, with express orders not to open them till at such a time and at such a place: this is an established rule at sea, and can also be practised on shore when employed in an expedition which it is essential to conceal from the enemy.

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SECT. II. *Of Ambuscades from the Army.*

A GENERAL who loses a battle, says Vegetius, may attribute his ill luck to fortune, although these kind of events are generally the effects of art and skill; but he who suffers himself to be surprised, and who falls into the snares laid for him by the enemy, has no excuse to make, because, by his vigilance, and the goodness of his spies, he might have avoided them.

A design should never be formed for an attack upon marches, detachments, convoys, forages, or upon one or many quarters, without knowing the ways which are to be passed, and the places where ambuscades may be formed; whether to avoid, or whether to conceal troops in them, in order to facilitate a retreat, or to draw the enemy into it. A general who receives information from his spies that some enterprises are intended upon some bodies detached from the army, upon one of his convoys, on a forage, or upon his quarters, ought also, on his side, to form ambuscades in the ways leading to it. The number of troops in ambuscade ought to be regulated by that of the detachment intended to be surprised; it should be sufficiently strong to attack the enemy on all sides, that is, in head, flank, and rear. The troops who set out to form an ambuscade should always march by night, unless it be in a country so covered that the enemy cannot perceive them.

A general, according to Santa Cruz, should endeavour to form as many ambuscades as possible; so that if the enemy should not fall into one, he may not escape the others: they ought to be disposed after such a manner, that one can neither attack nor be attacked without being heard, sustained, and assisted by the others: this junction is a stratagem which the enemy could not expect, and which will assure the victory. If, from the fewness of the troops, or the fatigues of the campaign, it is impossible to form many, there should at least be one sufficiently strong to resist the enemy it would attack: but still it is not requisite that it should be as numerous as the enemy, because troops in ambuscade, who charge a detachment that is unprovided on all sides, ought, by this surprise, to have a particular advantage, and consequently supply the place of number; which will certainly be the case, particularly if the enemy falls into the ambuscade during the night, and that care hath been also taken to place a great number of drums and trumpets, that when the troops of ambush charge, they may serve to increase the numbers in appearance, by the terror which noise always raises in the night-time.

In order to deceive the enemy who is in detachment, small bodies should be sent out towards him, with orders to retire to the troops in ambuscade as soon as they meet him.

Ambuscades should always have some object. Before they are undertaken, it should be known whether the enemy is in the field; if he intends either to attack or molest the quarters; whether it is proper to wait for him or to seek him: without these precautions the troops will be fatigued, and no end answered.

Ambuscades may be composed of infantry, hussars, or dragoons; but it is the situation of the country that must determine which. These troops may be mixed together or sent separately; but that must be according to the design intended to be executed, or according to the nature of the troops employed by the enemy in his detachments.

If the design is to attack a convoy, all these troops are necessary, because the escort of it will undoubtedly consist of infantry, cavalry, or dragoons, and also some hussars to clear the march; if a green forage, infantry is very neces-

sary, but it should always be left in the rear to secure the retreat: cavalry, with hussars or dragoons, is sufficient to attack a forage, to beat the escort of it, or at least to prevent the foraging being executed. If a dry forage is to be attacked, it must be done with infantry, because, as it can only be performed in the villages, it is certain they will be occupied by infantry, and that there will be a chain of cavalry in the front, which will be protected by it: if a detachment, it is according to the nature of the country through which it marches; if an open country, horse, hussars, or dragoons, must be employed: but in a woody or mountainous country, infantry must be made use of. After all that can be said, it is impossible to lay down fixed rules for the kind of troops which should be employed: there are some woody countries where hussars and dragoons can act with ease, and be of great service: there are mountains where they can act securely, because very fine plains, divided by woods, are to be found in the bodies of them, where they can place themselves in ambuscade; but care must be taken to secure their retreat. There are, on the other hand, plains so divided by hollows and canals, that infantry only are capable of acting; therefore it is the general's business to discover from which kind of troops, in either country, he may expect the greatest advantage.

There is no country but presents some place proper for forming ambuscades; hollows from which it is easy to fall, the least height, woods, hedges, ruins, vineyards, sometimes corn-fields, marshes covered with reeds, all present expedients to a general who knows how to take advantage of them: he must only be careful to place the ambuscades after such a manner that they shall not be discovered by the enemy's parties; and that they are not themselves discovered by the inattention of any of the soldiers, by noise, or by other accidents.

If the ambuscade consists of hussars or dragoons, the horses must not be together; their neighings may prove very prejudicial. Even a peasant, attracted by the barking of a dog or the neighing of a horse, may go into a wood, discover an ambuscade, and, often induced by the hope of a reward, will go and give the enemy information of the whole. Every person passing near an ambuscade should be stopped, and that without noise; the peasants should be tied to trees, and guarded by sentries. If the ambuscade is formed in an hollow way, behind an high ground, or in any places whatever, the general must cause every body that is taken to be tied together, and well guarded.

The troops in ambuscade must fall on all parties of the enemy that pass near them, unless when the design is to carry off a convoy or to attack a large detachment. It should in that case continue silent, and let them pass: but if these parties, by making a strict examination, discover the ambuscade, as there can no longer remain any hope of attacking the convoy or detachment, it should fall upon and endeavour to surround them, and, if possible, take them prisoners; and if the troops in ambuscade are so lucky as not to let any of the enemy escape, the ambuscade may remain in its first situation, but always pursue its first object, because here will be no reason to apprehend the enemy's having received intelligence of it.

The troops in ambuscade should attack these parties sword in hand, and not with their fire-arms, and, if possible, prevent them from using theirs. From this manner of attacking, there will result two considerable advantages. The first is, that a brisk and unexpected attack astonishes, and scarcely gives them time to think of their defence. The second is, that, by firing, it is to be feared, that if there are any other parties farther off they will hear it, and send and give notice. In that case, the ambuscade must change situ-

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ation, and place itself in some other part, but not abandon its original project till the last extremity, and till there is no longer any hope of succeeding otherwise.

The least thing, as has already been said, may be the occasion of an ambuscade's being discovered. The fire of a pipe may be seen at a great distance in the night-time; besides, however small the number of soldiers who smoke may be, the wind may carry the smoke and the smell of the tobacco toward that part where the enemy patrols. The ambuscade should not be cumbered with servants, or any thing else that is unnecessary; orders should be given that the horses are tied with care, and that a profound silence is observed by every body. As it is very difficult for hussars or dragoons to march without leaving marks behind them, by which means the road leading to the ambuscade may be discovered, they should try to enter it by some bye-way, or at least by as dry a one as possible. In order to efface the marks of the horses feet, eight or ten hussars or dragoons may tie branches of trees to their horses tails, and, by marching behind the detachment, in as large a front as the whole body, will destroy any marks that are made: as soon as they shall have entered the wood, they will close up the entrance with the same branches, of which they will make a sort of hedge.

If the detachment intended to form an ambuscade, whether infantry or cavalry, is obliged to march upon a high-way, as soon as it comes near the place appointed, the commanding officer should detach a body on before, with orders to take up the same front as the whole detachment. As soon as it shall have proceeded a quarter or half a league, it will return by another way; and it should also make a large circuit, so that the enemy's parties, coming the same way, will not perceive that they shall be stopped by any troops in that place. This body will rejoin the troops which are in ambuscade, by a road the most out of the enemy's view, never in a body, but scattered, so that they may leave fewer marks behind them. Sentries should be concealed behind bushes, in the front of the ambuscade, so that they may be able to see the country and ways about them, without being seen themselves: two or three soldiers should also be made to climb into trees, in order to see at a great distance, and give notice if they perceive any troops; the same method must be observed with regard to hussars or dragoons.

Before the commanding officer enters the wood where he would form his ambuscade, he should detach two or three patrols to scour it, for fear the enemy should happen to be there in ambuscade himself; after every part has been searched, the troops must enter the wood, and range themselves according to the order that shall have been given them. The commanding officer will form three bodies of his detachment, and place them at a distance one from another; one will be destined to attack the advanced guard, the other the centre, and the last the rear-guard. If the detachment consists of cavalry, the half of each corps should be on horseback; no persons should slip or pass the sentries or vedettes under pain of being declared deserters. During the night, the cavalry should be mounted, and the infantry under arms: in the day-time, half those on foot will relieve those on horseback every three hours; and the same should be done with the vedettes, as well as the infantry and sentries.

If the ambuscade is behind an height or small mountain, sentries must be placed on the top, lying on their bellies, and without hats: in other respects the same dispositions ought to be observed, whether on the march or for the conducting of ambuscades, always paying a proper regard to circumstances and the situation of the country.

There are divers methods of drawing the enemy into ambuscades. The general commanding the army or quarters sends out a detachment under the command of an intelligent officer, to form an ambuscade, at the distance of one or two leagues, more or less, according as the country is fitting for those sort of dispositions, or according to the distance of the enemy. The general must acquaint this officer, that two hours after he is set out, he will send out another detachment, of less force, with orders to go on the side where the enemy is, to endeavour to meet him, and at first fight to make a feint of charging him; but, as if finding him too strong, he will begin his retreat, directing it toward the place where the troops are in ambuscade; furnished with these instructions he will set out.

Then the general will send for the officer intended to command the detachment that is to go in search of the enemy, and inform him of that which is set out to form the ambuscade, and of the place where it is; he will order him to advance as near to the enemy as he can, and to draw him by a feigned retreat upon the troops in ambuscade.

These two officers should be the only persons informed of the design: but nevertheless the commandant of the detachment which is to go towards the enemy, may communicate it to the principal officers under his command; so that in case he should be taken or killed in the retreat, he that succeeds in the command may be able to act according to the general's intentions. He must be particularly careful, that no soldier, trooper, hussar, or dragoon, penetrate into the design of the detachment, as it would then be in the power of a single deserter to make the ambuscade miscarry. The detachment which is to go and seek the enemy, in order to draw him into the ambuscade, ought to be composed of hussars, unless the country be of such a nature that infantry only is capable of acting.

During the time that the hussars are gone before, endeavouring to draw on the enemy, the troops in ambush will be on horseback, and waiting in silence for their commander's order to go out and charge. As soon as they shall have charged and beaten the enemy, for fear lest another detachment, at a little distance from that which has been beaten, should come to its assistance, they will take the shortest way, and march leisurely, but with order, towards the camp or the quarters. The detachment which drew the enemy into the ambuscade, must form the rear-guard of it, and will march slowly on, while the rest of the troops will retreat, conducting the prisoners with them. If the enemy sends any succours, as soon as the rear-guard perceives them, it will double its pace, but with order; there will be no reason to apprehend the enemy's coming too briskly upon it, because he will be fearful of falling into another ambuscade: thus the rear-guard will retreat with ease, and the troops who conduct the prisoners have time enough to reach the camp, without any molestation.

It is on these occasions that a man should know how to keep his courage within proper bounds, and be sensible that flight is glorious: the despair of an enemy that is surprised, and even beaten, is always to be feared, when he is not entirely defeated. A man should always be content with one victory, without attempting a second: he may, by pursuing the enemy too eagerly, fall himself into ambuscades more dangerous than that he has just drawn the enemy into.

If there is reason to apprehend that the enemy, having notice from some deserters, are coming in full strength, the ambuscade must then change its situation and draw nearer to the place from whence it set out. This will serve two purposes; for should the enemy appear in force, the ambuscade will have the shorter way to retreat; or it may again happen that

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that the enemy, not finding the ambuscade in the places pointed out by the deserters, will imagine it to be retired, and, in that belief, will neglect the precautions necessary in such a situation.

An ambuscade that is successful may cause the destruction of a whole army. The example cited by M. de Feuquieres, in his Memoirs, on that head, is striking. M. de Luxemburg, still attached to the prince, took all the baggage belonging to M. Turenne's army, because the lieutenant-general who commanded the escort did not foresee that the enemy, shut up in his lines of circumvallation before Arras, having two armies near his camp with a design of attacking him in his lines, could think of sending out a large detachment of cavalry on an enterprise of such a sort. In the mean time M. Luxemburg, who was in ambuscade, within reach of the column of baggage, seeing that the lieutenant-general was gone on before with the head of the escort, imagining the baggage in security, marched speedily to the head of that column, whose march he stopped, and turned toward St Pol, where he conducted the whole baggage belonging to M. Turenne's army, without his knowing any thing of the matter. It is thus that, by the negligence of an officer, and by an ambuscade seasonably placed, an army finds itself stripped of all its baggage, and, as may be said, not in a condition of continuing the campaign.

If this lieutenant-general had been provided with spies, detachments in front and on the flanks, these detachments would have discovered the ambuscades, and, by the precautions usual on such occasions, he would have placed the baggage of the army in safety. Again, his spies would have given him notice, that a large body of cavalry was detached from the camp before Arras, consequently he would have been upon his guard; instead of which, being full of a false confidence, he marched as if in a champaign country, and, by this unpardonable remissness, occasioned the loss of the whole baggage. An officer who commands a detachment for any expedition whatever, cannot possibly take too much care to foresee the checks that may happen to him; if he is beaten, it should be wholly owing to a superiority of force. He who, after having taken all the precautions possible, is beaten by an enemy who has the advantage of number, has nothing to reproach himself with: but he who, with ability, has nevertheless neglected certain precautions, and is beat because they were not taken, is certainly culpable in the eyes of intelligent men.

SECT. III. *Of Camps in offensive War.*

To take an advantageous position for an army; to make choice of a spot that by its situation is strongly secured; to establish a camp there, and to be also able to have the army within distance of marching easily to the enemy, without fear of being molested; in short, to throw such difficulties in the enemy's way as may prevent his harassing the army, is one of the most essential branches of knowledge for a general. He who is endowed with this talent can, with an inferior army, not only make head against the enemy, but also cause his designs to miscarry; fatigue him the whole campaign by marches and counter-marches, which lead to nothing; oblige him to remain inactive, and at length draw him into a favourable position, where he will be morally sure of beating him. All this was done by M. Turenne in 1675, who, after having exhausted every expedient wherewith his military knowledge could furnish him, to draw M. de Montecuculi into a disadvantageous post, at length succeeded, found an opportunity of attacking him, and gloriously fell at the instant victory declared itself in his favour.

Before a general takes the field, he ought to be very certain what number of troops he shall have, that his magazines both of war and provision are ready, as well as the waggons, pontons, and all other implements whatever that are necessary for an army; for events may happen that it is almost impossible to foresee, and which often alter the best concerted designs. But when every thing is in order, a general possessed of the necessary talents can foresee the event even before taking the field: he will know beforehand the marches he is to make, the camps he is to occupy, and those which the enemy will endeavour to seize in order to oppose his designs.

An offensive war is undoubtedly carried on with greater ease in an open than in a mountainous country. But whether in the one or in the other, no superiority of number should make a general neglectful of the safety of his troops in their camp; he should always be assiduous in preserving the strictest order and discipline among them; one or two checks are generally sufficient to discourage the soldier, and take away that confidence which he ought to have in his general: the advanced posts should be well guarded, the flanks secured, and detachments frequently sent out towards the enemy; for as success is insured by vigilance and care, so negligence and slack discipline are ruin to the most formidable army, and entertaining a contemptible opinion of an enemy renders him more daring.

It is to be observed, that a camp ought never to be fixed on the banks of rivers; but a sufficient space should always be left between them and the camp, to draw out the army in order of battle. If this precaution is not taken, it may happen that the enemy, encamped either near to or at a distance from the other side of the river, being informed of the position of the army, will come in the night to alarm the camp, and by a discharge of artillery and small arms throw the whole camp into confusion, without risking the loss of a single man. For this reason, a camp should always be placed at least eight or ten hundred yards from a river; so that the guards may be advanced without being exposed, and within the circumference of the camp and compass of the guards the army may be supplied with forage for at least four days, and more if possible.

There are some situations for a camp which are in appearance strong, but may notwithstanding prove very dangerous, if care be not taken to examine whether or not the army can with ease come out of it, to form itself in order of battle; or whether the enemy can prevent it, by blocking up the avenues and outlets. If this precaution be not taken, an army may be the means of shutting itself up; as was done at Senef in 1674, and by the allies at Aschaffembourg in 1743.

The choice and strength of a camp depend on the position of the enemy and situation of the country: a general should always avoid encamping the cavalry in a wood, and should be particularly careful that the wings are sheltered; the woods should be occupied by the infantry, and entrenchments thrown up in front, according to the designs intended to be put in execution. If the wings are sheltered by a village, it should be entrenched, and infantry posted in it; and the camp should be covered by a river as much as possible, unless the intention is to march towards the enemy; then all the obstacles that can prevent the army coming up with him should be avoided: but if, from some successes of the enemy, or from his superiority of troops, the general cannot determine upon opening the campaign offensively, he must use other means to bring it about; and in the mean time should strengthen himself in his camp, establish posts on the banks of the river, and cover them by continual detachments of light horse; who, by extending themselves,

will

Offensive Operation. will prevent parties of the enemy from passing to seize on the hind-parts of the camp, molest the convoys, and attack the foragers.

Whatever may be the nature of the country, it is often necessary to have corps detached from the body of the army, to cover or keep open a communication with some place, in order to prevent the enemy from foraging too near the camp; to preserve the forage; to raise contributions at a distance; to occupy some advantageous post; to oblige the enemy to divide his forces in order to oppose that body; to cover the camp either in the front or on the flanks, according to that side which is left most unguarded and exposed: in a word, there should always be continual detachments toward the enemy, as hath been the practice of many generals, and particularly of marshal Saxe. The strength of this body is to be proportioned to the use designed for it by the general; but it is usually composed of light horse, some regiments of light infantry, and a brigade or two of dragoons. In the end will be seen what use should be made of this body; but in whatever situation it is to be placed, the communication between it and the army must always be kept open, that it may at any time be able to join it on the first order; and its camp must be so chosen, that the general may always receive intelligence from it of the least movements made by the enemy. See Plate DXVII.

In every country, and on every occasion, a camp is always defective if the wings are not sheltered, or can be easily distressed by the enemy; if the front is not guarded and the rear well covered; if the communications with the frontier towns are not secure and easy; if there is any want of forage, wood, and water; and if there are not detachments in front, to prevent the enemy from approaching the camp.

A general who joins experience and study together, ought to see into the intention of the enemy's general, and judge of his designs by any of his proceedings, however trifling. All those who are destined to the command of armies cannot indeed be endowed with this quick and exact eye, that ready power of judging of a good motion or a good position upon the spot. Some generals have excelled in marches, others in the position of camps; these in the arrangement of troops in order of battle, those in their conduct in time of action; others in providing subsistence, others in projecting a campaign. There have nevertheless been some of these great men, whose genius and temper have united and carried all these qualifications to the greatest degree of perfection; but the rarer these examples are, the more a man ought, by continual study, to endeavour to augment their number, and strive to merit the honour of being enrolled among those heroes, the ornament of mankind, their country's support, and their master's glory.

SECT. IV. *Of the Attack of an Army on its March.*

HOWEVER difficult certain operations in war may appear, they are nevertheless not impracticable when a general knows how to take the necessary precautions for lessening those difficulties. The attack of an army on its march seems to be above all reach of attempting; whereas the success of such an attempt depends only upon knowing how to take proper measures, on choosing the ground, and on seizing a favourable opportunity.

When an army would attack another upon its march, it should endeavour to be beforehand with it, and, by the means of stolen marches, come up with it before it can know any thing of the matter: some parties should be detached, who must place themselves in ambuscade, in order to stop all the comers and goers, so that the march and designs of

the army may be kept secret from the enemy. Whenever a general hath determined to attack his enemy, he should send off all the baggage, both great or small, belonging to the army; and it should be left in the rear under a good escort, near enough to join after victory, without the army's being obliged to wait three or four days for it.

The general should be well assured of the day on which the enemy's army sets out; of the country through which it is to march; whether it is an open, mountainous, or woody country; if it is divided by rivers; whether there are many bridges to pass; and in how many columns it marches: he should also get all possible information of the disposition of it. In the third section of the first part, relative to the march of an army in an open country, the disposition which it ought to make, in case it presents its front or flank to the enemy, hath been laid down. The general designing to attack ought to regulate his dispositions by those which the enemy hath taken, and which he can only know from his spies; but if he cannot receive any information concerning them, the best rule for him is to suppose them good, and to form his own accordingly.

As in the case of a surprise there cannot be signals given, without running the risk of the enemy's discovering that he is going to be attacked; it is therefore necessary, that every general officer leading columns should have a watch, regulated by the general's, so as to march all at the same time, at the hour agreed on and ordered. The ancients, destitute of watches, regulated their motions by the course of the stars; and it is, without doubt, on that account that Polybius, Onozander, Ælian, and many others, exhorted military men to the study of astronomy: but as it is not often that an army marches by night, this knowledge would be very useless for an attack in the day-time; besides, the sun, by which they were also regulated, could be no way serviceable to them, should the sky be overcast.

If the general's intention is to attack the enemy's army in front, he must detach all his light troops, sustained by a large body of cavalry and some battalions, with orders to harass the flanks, in order to perplex the enemy with regard to the real attack. It is impossible to give the enemy too many false alarms with regard to what is really designed: the hussars, from their readiness in retreating, and their quickness in passing from one spot to another, are the fittest troops for these sort of expeditions. The same rule ought to be observed if the real attack is designed to be upon the flank; then the false attacks should be upon the front. In Santa Cruz may be seen the dispositions which he has made to attack an army on its march.

Stratagem, and the means of surprising an army, are allowable in war, provided treachery is avoided. Whilst the law of nations is not infringed, successful stratagems add lustre to the genius of the general; but there is no profession in which rectitude of mind is more necessary than in that of war.

In order to carry on a surprise by stratagem, one of the most certain methods is, to calculate what time is necessary for the army to arrive at day-break near the road by which the enemy is to pass, so as to be able to examine the country, and make the necessary dispositions for the attack. In an open country the army may be concealed behind corn, or behind a rising ground. Prince Eugene, in 1702, after the battle of Crostolo, having gained some days march of the king of Spain, posted himself between the Zero and the Po. He so well concealed his army behind the bank of the Zero, that the combined army of France and Spain, which was on its march, and ready to enter into its camp, was obliged to range itself in order of battle, and to fight, without having scarcely time to make any disposition.

A woody country offers more expedients for the concealing of troops: but as it is to be supposed the enemy's advanced guard will be advanced at least a half or three quarters of a league, to scour the country; therefore, if the general's design is to attack the enemy's flank, he must present some cavalry and hussars in the front of the enemy's army, so as to engage his attention. Some infantry should be placed in the woods, in the rear of these troops, in order to sustain them: this cavalry and the hussars should retire in proportion as the advanced guard advances, in order to induce the enemy to believe they are not sufficiently strong, and that the reason of their advancing was only to examine the march of the army. As soon as the enemy shall have reached the place agreed on by the generals leading columns that are to attack, the body of infantry that is in ambuscade in the wood, the number of whose columns should be regulated according to the situation of the country, will march silently, and near enough to the enemy, and will charge him with bayonets, without giving him time to recover himself: during this attack the cavalry, dragoons, and hussars, who keep the enemy's front in awe, will charge the troops who have passed the wood and spread themselves over the plain. These troops of cavalry must be sustained by the infantry which was in their rear in the wood, and which should be furnished with cannon. These two attacks, made one after the other, but at some small distance of time, will render the enemy doubtful with regard to the dispositions he is to make; he will be undetermined where to send assistance, as the cannon which he will hear at the head will induce him to believe that attack the real one: he will fly to that part, and will consequently weaken the flank, which is designed to be attacked by all the infantry. By this diversion the flank will with greater ease be broken through, and the enemy taken in rear: the enemy thus surrounded, and finding himself between two fires, cannot avoid being beaten.

It is more difficult to form ambuscades in an open country, particularly for a whole army, unless it should find a bank like that at Zero; then the general should consider whether or not the attack of the army on its march is practicable. If the general by his superiority can, without weakening himself, divide his army, and find means to conceal it, he will attempt the attack, provided that each detached body is posted before the enemy has begun his march, and that they can all join on the first order, without a possibility of being cut off or finding any obstacle to prevent their marching up to the enemy: but, in order to a greater certainty of success, these first dispositions being made, great exactness in giving, and diligence in the execution of the orders, is necessary; each separate body should charge at the same time, and at different parts. But as the attack may prove unsuccessful, whether owing to the good disposition of the enemy, or whether because the attacks were not made together or executed with equal vivacity, it is necessary that the general should have provided for a retreat, and that the officers commanding different bodies should know after what manner and from what part it is to begin. For the greater security, the general officers ought to communicate their instructions to the commanding officer of each body composing that which they command, so that at the time of the attack or of the retreat, they may instantly comprehend the meaning of whatever they are ordered to perform.

If the army intending to attack the enemy on his march is weaker, or equal, either in number or in the nature of the troops, it is then only the situation of the country, and the facility with which the enemy may be surprised, that should determine the attempt of this grand enterprise: the

prudence of the general, his experience; that of the generals who are under his command; the quality of his troops; whether they are well disciplined or not; whether they are composed of one or of many nations; the quality of the troops to be attacked; and, in short, the genius of their general, are circumstances by which the attacking or not attacking should be decided. It is impossible to be decisive upon these circumstances, which depend entirely upon the ground, upon the vigilance of the enemy's general, upon the order which he causes his troops to observe in their march, and in short upon the troops under his command. A general, at the head of a well-disciplined army, composed of veterans and good general officers, will undertake and execute designs which he would not even dare think of with a new-raised army, however numerous: it is also very difficult to surprise a vigilant general, who is besides a good soldier, and who is also assisted by the counsels of able and intelligent officers.

A general should also be guided, in attacking the enemy on a march, by the country and the nature of the troops of which his army is composed. If the enemy marches through an open country, and the general is equal to him in infantry but superior in cavalry, he should make no hesitation in attacking him; but if the country is woody or mountainous, and the enemy's army is more numerous in cavalry than infantry, the general has still the same advantage with a superiority of infantry; because the enemy's cavalry in those kind of countries is unable to act against infantry; and the infantry also which the enemy may have will never be sufficiently strong to maintain itself upon the heights against forces so superior: and if the heights are forced, there can be no doubt of the enemy's being beaten, of his cavalry being ruined and crushed to pieces, or that his retreat will be attended with great difficulty, and that he will lose the greater part, if not the whole, of his army.

SECT. V. *Of the Attack of entrenched Camps.*

THE principles of war among all nations and in all times have been still the same; but the little experience of the early ages of the world would not permit those principles to unfold themselves, as they have since done, and to which it is owing that new expedients both for attack and defence have been discovered.

What a sensible difference is there in the military art, such as it at present is, compared with that of which the rules are handed down to us by Onozander, Vegetius, the emperor Leo, Frontinus, Ælian, and many others? The towns, in their times, had no other defence than walls, raised at a great charge, flanked at little distances with towers, and a large ditch in front: it is true that the little force of their weapons contributed much to the advantages of their fortifications. Their entrenched camps had only a large ditch with some waggons placed behind it; and whenever the ancients were willing to practise all the art at that time known in war, they surrounded the camp with walls, in the same manner as they did their towns, with towers at little distances. Of this kind was Pompey's camp at Dyrachium in Epirus, the plan of which is given in the marshal de Puysegur's Art of War: the wall by which it was surrounded was 15,000 paces in extent.

The emperor Leo was unacquainted with any other method of entrenching a camp, than by heaping fascines together, putting trees upon one another, and posting advanced guards.

The experience which hath been since acquired, hath, without increasing the labour, rendered the works of places stronger, and easier to be defended: the labour of the entrenchments

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trenchments for camps hath been shortened; they have taken a new form; and being constructed upon the same principles as the fortifications of towns, they are become more difficult to be forced (see Part I. sect. vi.). By this same experience the means of attacking them hath been discovered; and in proportion as offensive weapons have changed, and are become more powerful, the system of fortification has been new-modelled.

Let an army be supposed entrenched behind lines where art and nature are both joined; whose flanks are sustained and secured, furnished with troops and artillery along the whole front, with more troops behind to sustain those which line the lines. The general who would attack, ought first to survey the situation of the lines himself, and as much as possible the enemy's disposition; he should examine the construction of the lines, how they are supported, their extent, and whether the soil is firm or light. As soon as he shall be perfectly acquainted with these circumstances, he may form his plan of attack, and cause his army to march in as many columns as there are attacks to be made; but he should endeavour as much as possible to occupy the whole front of the enemy, in order to prevent him from sending assistance to those places where the attack will be briskest. The head of each column should be well furnished with artillery; and as soon as it shall be within distance of cannonading the lines with effect, it should keep up a brisk and continual fire for the space of an hour at least, so as to beat down the earth of the parapet, and tumble it into the ditch, which will in some measure render the passage of it less difficult for the troops. The time of the attack should be an hour before day, so that the cannon may have fired before the enemy shall know where to direct his artillery: after every discharge, the situation of the cannon should be changed either to the right or the left, in order to deceive the enemy's gunners, and prevent their knowing where to direct their pieces. If there should be any height within proper distance, the cannon should be planted upon it: if the cannon can be brought to cross each other upon the lines, the artillery will then have a very great effect.

The infantry should follow the artillery, furnished with hurdles, planks, fascines, pick-axes, and shovels; the fascines will serve to fill up the wells, if there are any, before the ditch; or if there are no wells, they will fill up the ditch, and the hurdles will be thrown over them. The cavalry should be formed in two lines in the rear of the infantry, in order to sustain it. The general should endeavour to find some ridges, to conceal the cavalry from the enemy; but should there be none, it must be placed at such a distance, as not to be exposed to the cannon of the lines; for should it be placed too near, it will very soon be destroyed, without having it in its power to be of any service. In the beginning of an attack of lines, the cavalry cannot be of any assistance, and cannot even act till the infantry hath penetrated in some part. It would therefore be useless to cause it to advance too near, provided it is within reach of marching readily when the infantry has passed, and hath made a passage large enough for it, by beating down the lines and filling up the ditch; the cavalry then will have no more to fear from the cannon of the lines, because the enemy's attention will be more engaged with endeavouring to repulse the infantry, than with firing upon the cavalry. As soon as the lines have been beaten down, and the enemy thrown into confusion, the infantry should march resolutely and together; and should take care to leave room for the artillery, so that it may advance at the same time, and continue its fire. The attack should be made by the grenadiers, sustained by the piquets: they will protect the soldiers who fill up the wells and the ditch; and as soon as

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they find an opportunity of passing, they will endeavour to get over the entrenchments, sustained by the whole infantry of the column, which will then be disencumbered of the fascines, hurdles, &c. in order to drive the enemy from his lines. As soon as there are soldiers enough upon the lines to bear the resistance of the enemy, the soldiers who have the shovels and pick-axes, and who ought to be last, will finish the filling up of the ditch by beating down the parapet of the lines, and making an opening sufficient for the passage of a squadron in order of battle. Then the whole infantry of the column that has broke through, will pass and divide into two parts, to let the cavalry pass, which will form under the cover of the fire of the infantry, and will not attack the enemy's cavalry till it shall have collected its whole force together.

If one of the attacks succeeds, on the first news, which will soon be spread throughout the army, all the troops at that time ought briskly to attack the whole front of the line, in order to employ the enemy, and prevent his sending assistance to that part that is forced. The reserve, which is composed of infantry and cavalry, ought to join the troops that have broke through the lines, to sustain the cavalry which is charging that of the enemy, and cannot be sustained by the infantry who passed first, because it is employed in taking the enemy in flank to the right and left. In this situation, when the reserve and all the cavalry which followed the column that hath passed, and to which others may yet be joined shall have passed, it should attack the enemy; if it is repulsed, it can never be to any great distance, because it has infantry behind it, to sustain it, and by its fire to stop the enemy. If the lines are forced by many columns, the success and also the defeat of the enemy will be thereby rendered more certain.

When the duke of Savoy and prince Eugene, still encamped between the town of Pianezza and la Venerie, in 1706, marched to attack the lines of the French army that besieged Turin, they caused their armies to march in eight columns; the infantry formed the advanced guard, the artillery, distributed by brigades, marched at the head between the columns, the cavalry was behind in six, and out of reach of cannon-shot.

The disposition of marshal de Coigny in 1744, in order to attack the lines of Wissembourg, of which the enemy were in possession; was similar to this, except that the whole of his army had not time to get up; but as the moments were precious, he did not wait for it. The army which came from Landau divided itself into four, which formed the four attacks; one of which was at Wissembourg, the other at the mill between that town and the village of Picards, the third at the village of Picards, and the last was made above that village, which was entrusted to the Hessian troops. His cavalry, which was behind, passed after the infantry had broke through the lines; but the enemy were then almost either killed or taken, and those who could save themselves, retired to Lautrebourg, where their army had assembled after having passed the Rhine. It is difficult to determine which is most to be admired, whether the general's disposition, the quickness and exactness of his eye, and his coolness in a circumstance so delicate, or the courage of the French troops, who forced these lines in less than two hours.

As soon as the enemy is beat and abandons his lines, he must be pursued, but with precaution. The vivacity with which he should be pursued depends upon the order with which he retires: if it is an open country, the general may follow him so long as he sees all clear before him; but if the country is divided with defiles and woods, it would by no means be prudent for him to engage himself in them,

for fear of any ambuscades being placed there by the enemy, in order to secure his retreat: nevertheless, the general should endeavour to make the most of his victory, and should never be content to win a battle by halves; at least it should be carried so far as to make the enemy sensible of his loss, and of rendering him incapable of continuing openly in the field.

But if the army that attacks the lines should be unable to force them, after many repeated attacks, and if the general perceives that his troops are discouraged, he should immediately retire. If the retreat is made over an open country, he should begin it by marching off the cannon, the infantry next, and the cavalry will form the rear-guard in two or three lines; the hussars and dragoons will be upon the flanks of the cavalry: if there are any defiles or woods to pass through, the general should leave some infantry at the entrance of them, to sustain and protect the cavalry, which will retreat by files. If the enemy is in full strength, the general should leave some field-pieces with the infantry that is posted at the entrance of the woods and defiles, which will certainly stop the enemy's impetuosity: if, on the contrary, the enemy pursues the army with only a few troops, it will be proper to charge him if he approaches too near. In this disposition an army may retreat easily, provided that order is observed, and the movements not made with too much precipitation.

SECT. VI. *Of the Attack of a Convoy.*

THE same motive that ought to oblige a general to practise every resource of art, in order to conduct the escort of a convoy in safety, should also induce him to use the same expedients to carry off the enemy's subsistence; for to deprive him of the means of subsisting, is, in reality, to overcome him without fighting.

An advantageous method for attacking a convoy is, by forming three attacks, one real and two false. Those attacks are called *real* which the troops make with vigour and in full strength, and when their charging is provided for and determined; the *false* ones are when the enemy's intention is only to keep back the enemy, and prevent his sending assistance to the troops that are really attacked.

These attacks, true or false, are determined by the situation of the country, and in proportion to the degree of ease with which the convoy may be turned from the road it is in; that is, if the general should meet with an avenue near the advanced guard, which will draw the enemy some distance from his main body, and which also leads to that of the troops which attack, it is at that part the real attack should be made: if this avenue is found at the rear-guard, the two false attacks should be made at the advanced guard and at the centre, supposing there is an opportunity of attacking the centre. These false attacks ought to be sufficiently numerous in troops, to be able to employ the enemy, without running a hazard of being beaten, and to prevent his sending assistance to other parts.

If the troops designed to attack the convoy are sufficiently numerous, although divided into three bodies, to attack every part at the same time with equal vigour, the success will thereby become more certain. The escort of a convoy is often more numerous than the troops which attack it; but it being certainly weakened by the division it is obliged to make in order to guard the whole length of the convoy, the troops which attack have greatly the advantage, although inferior in number, because those which they attack cannot send assistance to the parts attacked, especially if attacked on all sides.

If the road is wide enough, and there is room for a wag-

gon to turn, the general should rather choose to attack the advanced and rear guards than the centre, to prevent the enemy's saving any of the waggons belonging to the rear-guard, which will undoubtedly be the case, if only the advanced guard and centre are attacked. If the road is so narrow that the waggons cannot turn about in order to go back, the general should attack the advanced guard, and employ the centre and rear-guard as much as possible.

A convoy may also be attacked at the opening of a defile into a small plain; then it is again the advanced guard that the general should attack, though he should also contrive to have the rear-guard attacked at the same time. The troops in the centre will be confused, and not know where to send assistance, because they will hear firing both in front and rear; nevertheless, the general should defer charging till part of the waggons are passed, and the troops of the centre are still on this side the defile. An attack, when unforeseen, brisk, and sustained, can never fail of succeeding, particularly when the troops attacked are so divided as not to have it in their power to assist each other; and if the whole convoy is not taken, there is almost a certainty of taking a great part of it, or at least of setting it on fire, and hamstringing the horses, if there is not time to carry them off.

The success of these attacks partly depends upon the choice of those places where the troops which are to fall upon the convoy are placed in ambuscade; the most secure are those which are least liable to the inspection of the enemy's parties. It is sufficient to have sentries upon the tops of the hills, so that they may see into the roads, and give notice when the convoy is near the place appointed for the attack: then the troops charged with the attack of the rear-guard, having nothing more to apprehend from being discovered by the enemy's parties, may draw near the entrances of the avenues.

If the ambuscade is discovered, the conduct which ought to be observed by the troops composing it depends entirely upon their force and that of the escort; nevertheless, even when they are weakest, the attack should be attempted, which, if unsuccessful, will at least have retarded the march of a convoy, for want of which the enemy may be greatly distressed. A general never risks much in attacking a convoy; the object of the officer commanding the escort being to conduct it in safety, and to avoid fighting: it is the same with the escort of a convoy as with a chain of forage, the end of which is only to complete it; and consequently the troops charged with them will rather be attentive to execute the orders which have been given them, than to pursue the enemy, although beaten and driven back.

When a convoy marches through an open country, there should be many ambuscades formed: an enemy is less apprehensive in an open country, because, seeing all before him, his searches become the less exact, in proportion as the country is unfavourable for troops to form ambuscades; nevertheless, a general may always find some hollows, heights, or places of the same nature, where troops may be concealed. As soon as the convoy shall be arrived at the place fixed on for the attack, the general should fall upon the advanced and rear-guards, in order to take in the whole, and to induce, if possible, the troops in the centre to divide themselves, to run to their assistance; then the third ambuscade must show itself, and attack the centre, and endeavour to divide the convoy, before the commandant of the escort has had time either to park it or double it up. If the general succeeds in dividing the convoy, and if the troops in the centre of the escort are beaten and broke, he should detach some infantry, cavalry, and hussars, in pursuit of them: the remainder must be divided into two parts, in order

der to attack the troops lining the convoy; after which they must join those who attack the advanced and rear-guards. The troops, when re-united, ought to make this attack with vigour, and entirely determine the defeat of the escort, and consequently the taking of the convoy.

A convoy that is divided is half taken, as soon as the detachment of the centre is beaten; because the victorious troops can be divided, and part sent in pursuit of the body that is beaten, and the other part employed to reinforce those who still meet with resistance; whereas, if only one part is attacked, that which is not attacked can readily send assistance, especially in an open country, where there is nothing to prevent either cavalry or infantry from acting, and being a mutual assistance to each other.

A general who would attack a convoy never runs any hazard by dividing his troops, in order to divide those of the enemy: the more the troops of an escort are divided, with the greater ease will they be beaten. An officer who would attack, should know the strength of the escort, in order to regulate the number of his troops by the enemy's, and to be proportionably stronger. He who is attacked, being ignorant of his enemy's force, and being charged on all sides, is at a loss where to send assistance, and how to take care of every part: he who attacks by the knowledge he should have of the country, is enabled to post his troops after such a manner as to employ all those belonging to the enemy, without weakening himself. The troops which attack have certainly great advantages, because, in dividing them, they are still stronger than the body attacked; and then they can choose the place most favourable for the attack: whatever may be the precautions taken by the officer commanding the escort, whatever may be his vigilance, it will be very difficult for him, considering these different attacks and the number of the enemy's troops, to dispose his own with sufficient quickness to place the convoy in security, especially if the attack is made with great quickness and vigour.

When a convoy is to be attacked as it passes a bridge, the commanding officer should divide his troops into three bodies, placing two of them in ambuscade on that side of the bridge to which the convoy is advancing, and the third on the side from which it is marching. All the three bodies should remain concealed, if possible, till the advanced guard of the convoy, the body at the centre, and some of the waggons, have passed the bridge; when they should instantly advance and attack, each that division of the convoy properly opposed to it. Three such attacks, made at the same time by superior force, will have the whole advantage of the action; and the more so as the troops of the escort being everywhere employed, cannot send assistance to any particular part. If the two bodies which attacked the advanced guard and the centre should break them and put them to flight, there should be troops enough left in pursuit of them to finish their entire defeat, without any fear of being repulsed; the remainder ought to march to the bridge, and cause the waggons that are upon it to be ranged in order, and march to the rear-guard, in order to finish its defeat, if it still continues to make resistance.

It is necessary to observe, that some troops ought to be left at the head and along the convoy, in order to take care that the horses are not taken off from the waggons, and that none of the soldiers or drivers make use of that method to escape.

If the general has not troops sufficient to be divided into three bodies, he can place ambuscades to attack only the advanced guard and the centre. This must be done with vigour, but not till the troops of the centre shall have passed; and the attack should always be executed by the infantry

with the bayonets fixed, and without firing, and by the cavalry, hussars, and dragoons, sword in hand. The general should not then stay to make prisoners; but should put to death all those whom he finds armed. If the two first detachments are beaten, he should march with the remainder to the rear-guard, which, not being strong enough to resist a body of troops much more numerous, will undoubtedly betake itself to a retreat. As it is the convoy, and not the troops of the escort, that is the principal object, the general should leave only some troops of hussars to pursue the rear-guard; he should make the waggons file off as fast as possible, and conduct them the nearest way to the camp or the neighbouring town; or if this cannot be done, he must burn them and carry away the horses.

SECT. VI. *Of the Attack of green and dry Forages.*

NEXT to the convoys, the forages become most necessary for the subsistence of an army, as it is by them that the cavalry is supported; and if a general can contrive to deprive the enemy of them, or to molest him in the making of them, his cavalry will soon be without resource, his infantry without baggage, and his artillery without the means of being conveyed.

The detachment destined to attack a party on a green forage, made in an open country, should be composed of infantry, cavalry, and hussars: the infantry should not appear, but ought to remain in ambuscade in some hollows, behind some hedges, or other favourable places; and it should be careful not to show its arms; because, by the glittering of the steel, they may be discovered: the cavalry should be divided into two bodies, three quarters of a league one from the other, taking care to be able to join in case of necessity. As for the hussars, they should be distributed about in many small detachments to the right and left, and in the centre of the two bodies of cavalry; upon one of the flanks there should be a more numerous body of hussars placed in ambuscade, at a greater distance than the small detachments. Every one of those small troops should have a number of trumpets with them; and when the chain is formed, and the foragers spread over the plain, a part of these detachments should leave the ambuscades, making a great noise, and attack those belonging to the enemy which are advanced; and these detachments will charge them with so much the more vigour, as they will be sustained by the large body of hussars in ambuscade behind them, and which should march to sustain them, and attract the attention of the officer commanding the escort. It may happen that this first attack, made on one side only, may induce the enemy to unfurnish the chain in some place, by which it will consequently be weakened; and if to the other detachment of hussars shall instantly advance, followed by one of the bodies of cavalry, in order to attack that part that has been unfurnished. If the enemy, more prudent, does not weaken the chain in any particular part, but contents himself with making the reserve march to the assistance of the troops which have been attacked, the second attack ought always to take place; but in order to employ the enemy everywhere, the second body of cavalry should march and attack the centre. This attack ought to be made with great briskness sword in hand, whether the enterprise succeed or not: if it succeed, a great advantage may be drawn from the rout of the chain. Whilst the cavalry and part of the hussars are pursuing the troops of the chain, the other part should fall upon the foragers, where they will without doubt find but little resistance. If the attack do not succeed, and that, by the good disposition of the troops of the chain, the detachment has not been able to force it, it should retire to the infantry that has remained.

mained behind in ambuscade; this infantry will facilitate the retreat of the cavalry and hussars. But suppose that the enemy, too eager, is carried away by this first success, a great advantage may be derived from his imprudence, by attacking him resolutely. The whole strength, and each body being united, it is to be imagined, and even hoped, that the advantage will turn on the side of those troops which were repulsed but a moment before; and the more so, as the general commanding the chain can have pursued only with his cavalry, his hussars, and dragoons; because his infantry will have remained in the posts which it occupied, either to guard them, or to sustain the horse, supposing they should be repulsed.

If the forage is made in a mountainous country, the infantry must act alone, the cavalry being only necessary when it can have ground on which to act, and sustain the infantry in case it is repulsed: the infantry should attack the avenues and the heights, and possess itself, as much as possible, of those which have the greatest command, and make the attack in many places, as in an open country. These different attacks render the enemy undetermined with regard to his dispositions; he does not know where to send assistance; the uncertainty of the general becomes visible to every officer, and communicates itself to all the troops; and thence proceeds their confusion, and consequently their defeat.

The prisoners and horses that have been taken should be sent off first with an escort; the rest of the troops will retire immediately after by the shortest road. It is cruelty to abandon the wounded, whether friends or enemies; and as the detachment has undoubtedly found, within the circumference of the chain, some waggons with horses to them, they should be made use of to carry off the wounded, who should also be sent on before: if there are no waggons, the detachment must take them from the neighbouring towns.

The attack of a dry forage is conducted nearly in the same manner as that of a green one; but it is often necessary to employ a greater number of troops; because, as the forage is made in the villages, it is almost a certainty they will all be guarded by infantry sustained by cavalry; whereas the chain of green forage is formed with a much greater number of cavalry than infantry, unless it should be in a country where cavalry cannot act. It is difficult to force the villages where infantry is sustained by cavalry; whereas it is easy for cavalry to attack each other in a plain, where the affair is immediately determined; but it is not so soon decided when entrenched infantry is attacked by infantry: but whatever resistance a commander may find, he should always attempt to force it. As the principal object is to prevent the forage, it is obtained by attacking the chain briskly and in all parts; because it is certain that the general commanding the forage will cause the foragers to assemble; or else, seeing the chain attacked, without waiting for an order, they will of their own accord dismount, and fly toward the camp: but whether they assemble, retire in order, or shift for themselves, the end is answered, and the forage is left unperformed. If by their flight the commander cannot hope to make any prisoners, he must keep the troops of the chain at bay such a length of time as to make it impossible to continue the forage for that day: he should even if possible endeavour to force them to retire; which if they do, he should pursue them long enough to be certain of their retreat, and then collect all the waggons from the neighbouring villages, cause them to be loaded with the forage intended for the enemy's army, and conduct it to the camp: if they do not retire, the commander must remain in sight of them during the night, and send to the camp to demand a reinforcement of troops, in order to oblige the enemy to retire. For the same reason that a forage should

not be abandoned till the last extremity, the troops that would prevent the enemy from attacking it, should be absolutely bent upon it, at the same time without exposing themselves to the danger of being beat by any assistance that may come from the camp to the troops belonging to the chain.

SECT. XI. *Of the Passage of Rivers.*

THERE is hardly an operation of war more difficult than the passage of rivers, whilst war cannot be carried on in countries where there are not rivers to be passed.

Rivers may be passed by swimming, by fording, or upon bridges; but small bodies alone can pass with safety by swimming, and, unless the stream be very shallow, none but the cavalry should pass at a ford; for it is surely much better to throw over a bridge or two, than to expose the infantry to the fatigue of wading through a deep current, or the artillery and baggage to the danger of being damaged by water. When a ford is discovered and intended to be made use of, it should be secured in every part, and the soldiers employed for that purpose should be furnished with proper instruments to clear the bottom of every thing which may retard the passage. Its banks should likewise be examined, that it may be known whether they are of difficult or easy access, and whether the ground on the other side be marshy, or such as will permit the troops to form immediately on their landing. When bridges are to be built for the passage of the army, they must be laid upon BOATS, PONTONS, FILES, or WOODEN HORSES (see these articles); or in some cases RAFTS may be employed instead of them; and when a general is furnished with these necessities, he will pass the largest river, in the absence of the enemy, without difficulty or the loss of a man.

It is not, however, to be supposed that the enemy will be absent. When a country is invaded, the army that is defending it will endeavour to meet the invaders with the greatest advantage; and as in the passage of rivers the advantage is wholly on the side of the defensive army, the general commanding it should there, if possible, oppose the enemies of his country. We shall therefore, in this section, treat, *1st*, Of the defence necessary to be made for opposing the enemy, and preventing his passage; *2^{dly}*, Of the means which a general should employ in order to facilitate the passage, notwithstanding the enemy's opposition; and, *3^{dly}*, We shall demonstrate by facts the securest method of retreating.

I. It would be impossible to run through every precaution that can be taken to dispute the passage of a river; we shall therefore confine ourselves to the principal ones, by a succinct relation of the different systems of the authors who have treated on that subject.

The first precaution to be taken, according to the chevalier de Folard, is, to draw off all the boats which are upon the river; to observe whether any other river has a communication with it: to examine the course, the windings, and the most accessible parts of it; to raise good redoubts near the banks; to render the bottom uneven by means of sacks and baskets filled with stones, large trees with their branches, and by stopping them with stakes.

To this precaution may be also added another, which, executed with exactness, may produce great effects; that is, to throw whole trees with their branches into the river, not so heavy as to sink to the bottom, but whose size and quantity shall be so considerable as not to be easily stopped; their branches should also be interwoven, and formed like a chain from one bank to the other; they should be held fast till the enemy's army is engaged in the fords or upon the bridges,

Offensive
Operations.

bridges, at which time they should be let into the current, the quickness of which will increase the force of this kind of moving bank, which will overturn every thing it meets with, soldiers, baggage, horses, bridges, and boats: in short, nothing will be capable of withstanding it, if there is any degree of rapidity in the torrent. This method is pointed out in M. de Puységur as levelled against bridges only. To avoid also giving any suspicion to the enemy, this chain of trees can be placed upon the bank of the river, of which some engineer must have been careful to take the dimensions before-hand; and when it shall be nearly the same size of the river, and the enemy is passing, it must be held at one end, whilst it is shoved off by the other; the whole of it will be taken by the current, which, without any other assistance, will direct it against the enemy.

In regard to the troops designed for the defence, the best method, according to M. Folard, is to form small camps of 2000 or 3000 men, a league distant one from another, with patrols and signals from one to another; to have canoes, in order that the river may be crossed silently in the night by soldiers, who will endeavour to make some prisoners, and who will also listen in order to discover whether the enemy is preparing to march. A general should particularly endeavour to possess himself of the islands, if any, under cover of which the enemy may attempt the passage; and if the general can be certain that the enemy's intention is to throw over a bridge where they are, in order to set out from thence, to save so much of the way, the general will by this means assure himself of the place where the enemy will attempt the passage, which circumstance will be almost sufficient to prevent him.

But in order the better to explain the manner in which a river should be defended, let two armies be supposed, one of which, consisting of 40,000 men, defends the passage against another of 60,000. This last is divided into three bodies; that of the centre consists of 40,000 men, and the two others of 10,000 each: the centre-body is encamped nearly opposite to the place where the passage is intended to be effected; of the two bodies which are upon the flanks of the centre, one will serve to keep the enemy in suspense, with relation to the true place where the passage is designed. They ought to be continually moving, sometimes at a distance from the main body of the army, and pretend to throw bridges higher up, or lower down, in order to induce the enemy to divide and separate the different bodies of his army in such a manner, that they can no longer be of assistance to each other, or be in a condition of opposing a superior body of troops that may attempt the passage.

The army defending the passage is divided into many bodies; three of 10,000 men each, at a league distance from one another, and two others of 5000 men each, composed of the light troops, both horse and foot, and dragoons, encamped at half a league upon the two flanks of the army. The communication should be preserved between each separate body, and constant patrols kept upon the side of the river, which ought continually to cross each other; and detachments of hussars upon the right and the left, both up and down the river: the general is also supposed to have planted batteries of cannon, in different parts upon the shore; and to be possessed of two islands which he has fortified, and in which he has also placed troops and cannon: in short, he is supposed to have taken every advantage of ground for rendering the passage difficult to the enemy, and to oppose troops to him in every part where he may attempt it.

See Plate DXIX. fig. 1. where A represents the camp of the main army, divided into three parts, for the defence of

the river. B, The camp of the light horse, light infantry, and dragoons upon the wings of the army. C, Castle and village, guarded by light infantry. D, A town occupied by the infantry belonging to the army. E, Bridge broken down. F, Islands occupied by infantry. G, Posts of infantry distributed along the side of the river. H, Batteries established along the side of the river. I, Posts of cavalry, to keep up the communication between the camps. K, Bridges constructed to preserve the communication of the islands. L, Bridges constructed for the communication of the camps.

If, notwithstanding all these obstacles, the enemy attempts the passage, he should be attacked as he debarks; and it is for this reason that the defending army should not be divided into very small bodies, which, too weak to resist a superior number, will be easily routed. In attacking the enemy, there is no danger to be feared from their cannon, which they cannot make use of without annoying their own troops; whereas the cannon planted upon the side of the river, to defend the passage, can always fire upon the troops which follow, in order to sustain those who attempt the passage: there should also be infantry placed near these batteries, to defend them, and to flank such of the enemy as have already passed.

There yet remain many stratagems to be practised on these occasions: a general may make use of those mentioned in the section which treats of ambuscades; and they should be particularly directed against such places as are supposed to be most favourable for the enemy. The history of prince Eugene, whom the chevalier Folard styles a great traverser of rivers, furnishes many examples.

The general should be particularly attentive in disturbing the enemy when constructing his bridges; which appears the more practicable, as the bridge is never properly established, if not guarded at each end: besides, by the assistance of artillery, the enemy may be easily prevented from going on with his work. M. Feuquieres indeed relates examples, where the enemy hath not been able to prevent the bridges from being built under their very noses; but besides the rarity of these examples, the precautions he used are a very convincing proof of the difficulty attending such undertakings.

A prudent general, and one who is himself acquainted with the river, of which the enemy would attempt the passage, is guided by its depth, by the difficulty of gaining its banks, and in proportion to its rapidity: he often pretends to be inactive, permits the enemy to throw his bridges over it, and waits till he is in the middle of his passage; at which time he makes a furious fire upon him, spreads disorder amongst his troops, and overthrows his ranks; and the enemy, besides losing a great number of men, also fails in the success of his enterprise.

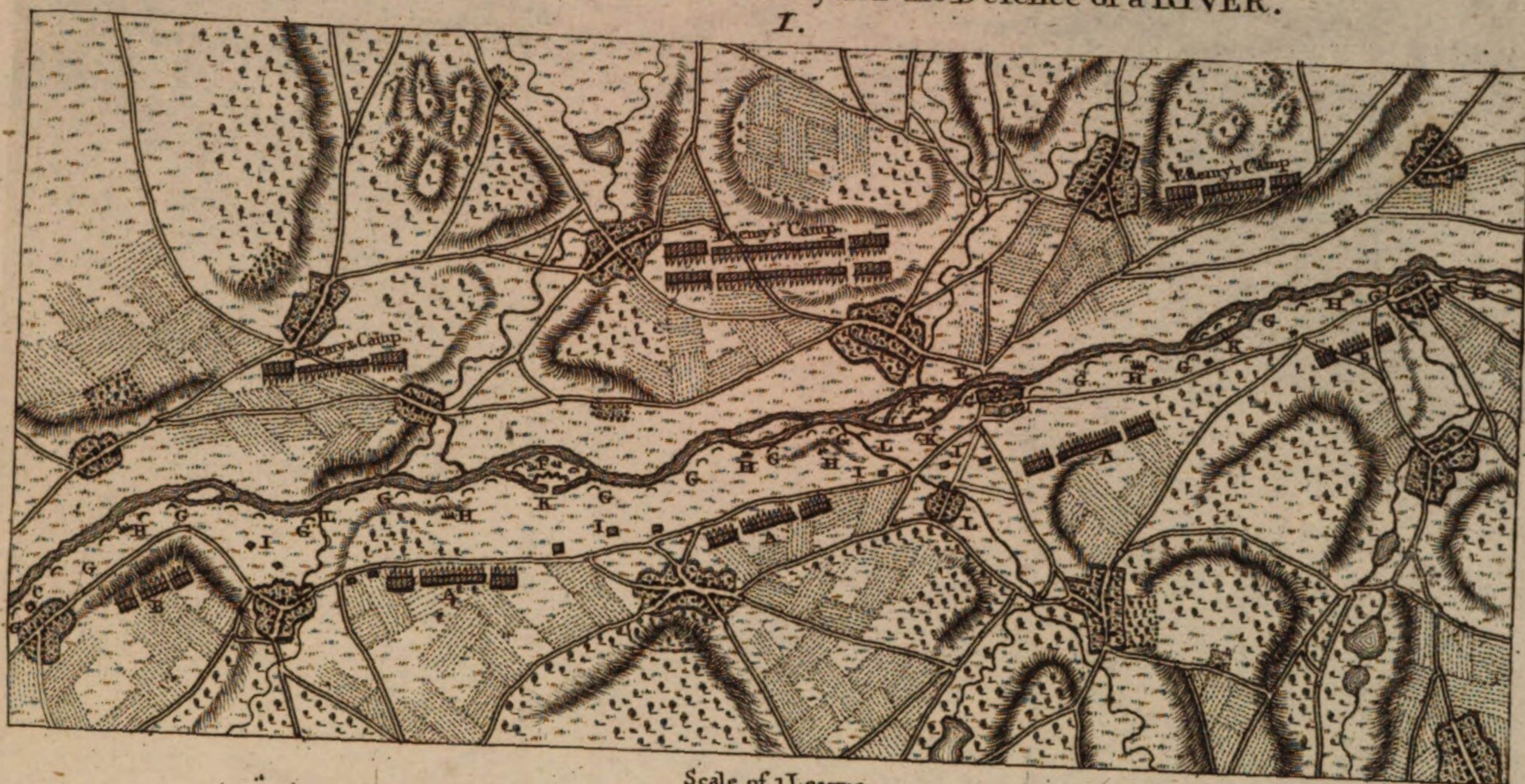
II. With respect to the means to be employed for passing a river in the face of the enemy, it is to be observed, that the general who attempts such a passage, ought, in the first place, to be very certain of the steadiness of his troops. He should place the most intrepid in the front, in order to encourage those who follow them: on such occasions every thing is to be apprehended from ill-disciplined troops, who, as soon as they are engaged in the river or upon the bridges, having no longer any place of refuge to fly to, will be discouraged, and spread the panic throughout the whole army.

If the army passes upon two bridges, it is impossible to take too much care for their security: history is filled with fatal examples of bridges falling under the weight of troops. One of the greatest dangers ever experienced by Charles XII. was when, having caused a bridge to be thrown

On five
Operations.

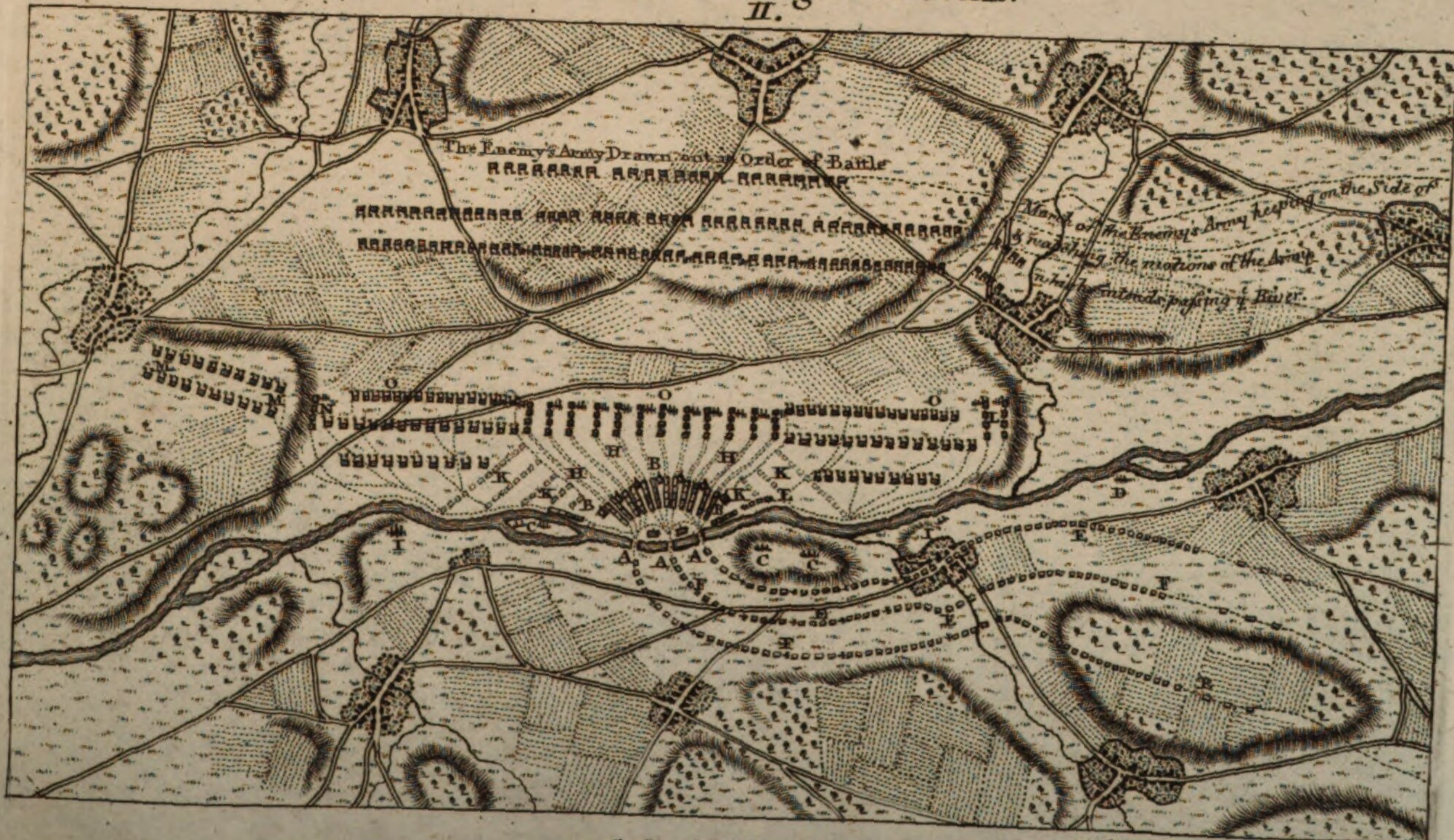
WAR.
 PLAN of the Position of an Army for the Defence of a RIVER.
 I.

Plate DXIX.



Scale of 1 League.
 100 400 1200 2400 f.

PLAN of the Passage of a RIVER.
 II.



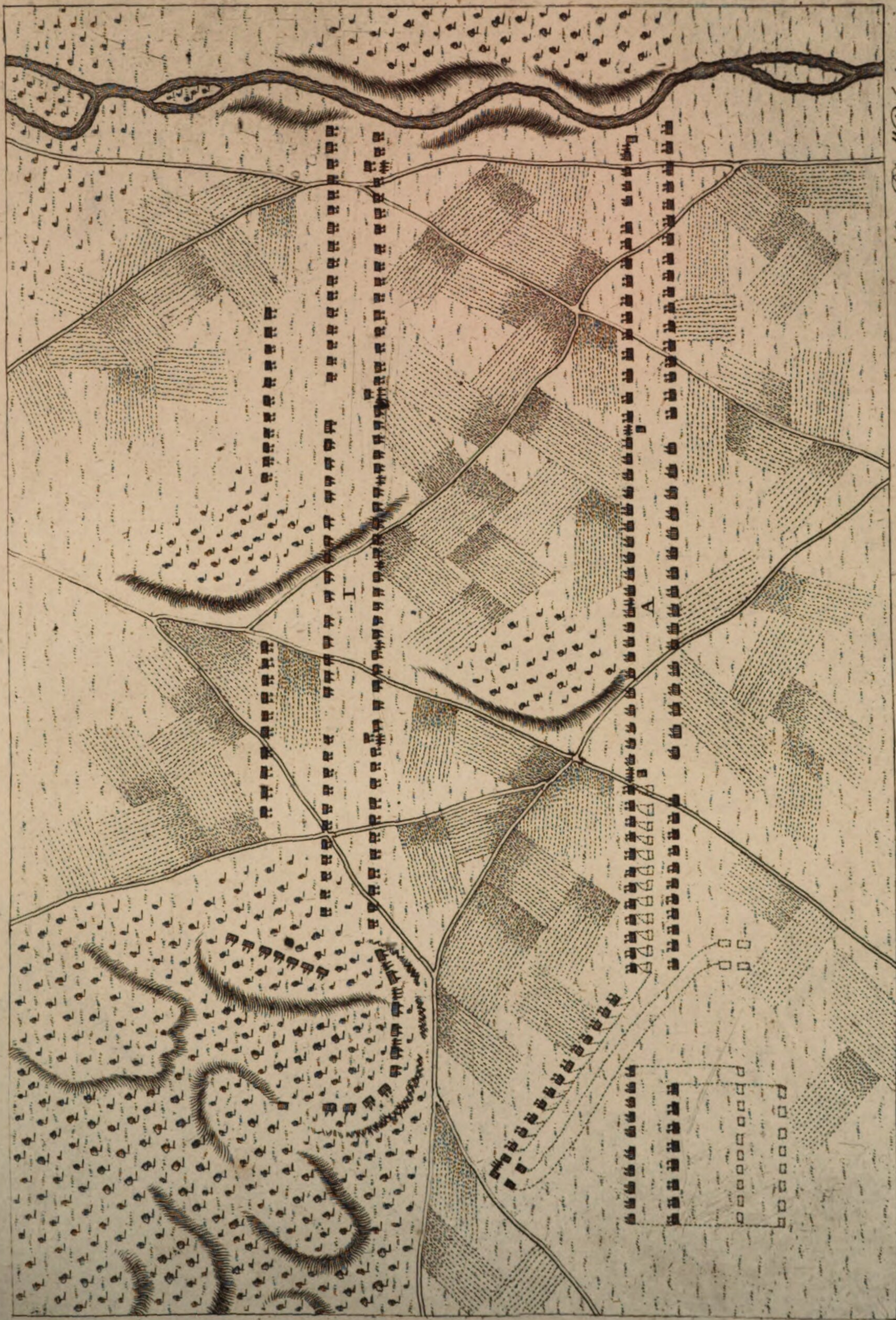
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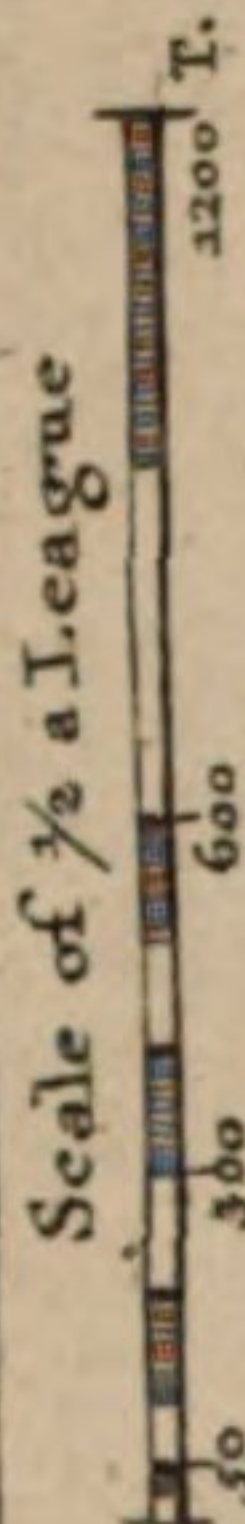
WAR.

Plan of an Order of Battle, I^{re} Disposition.

Plate DXX.



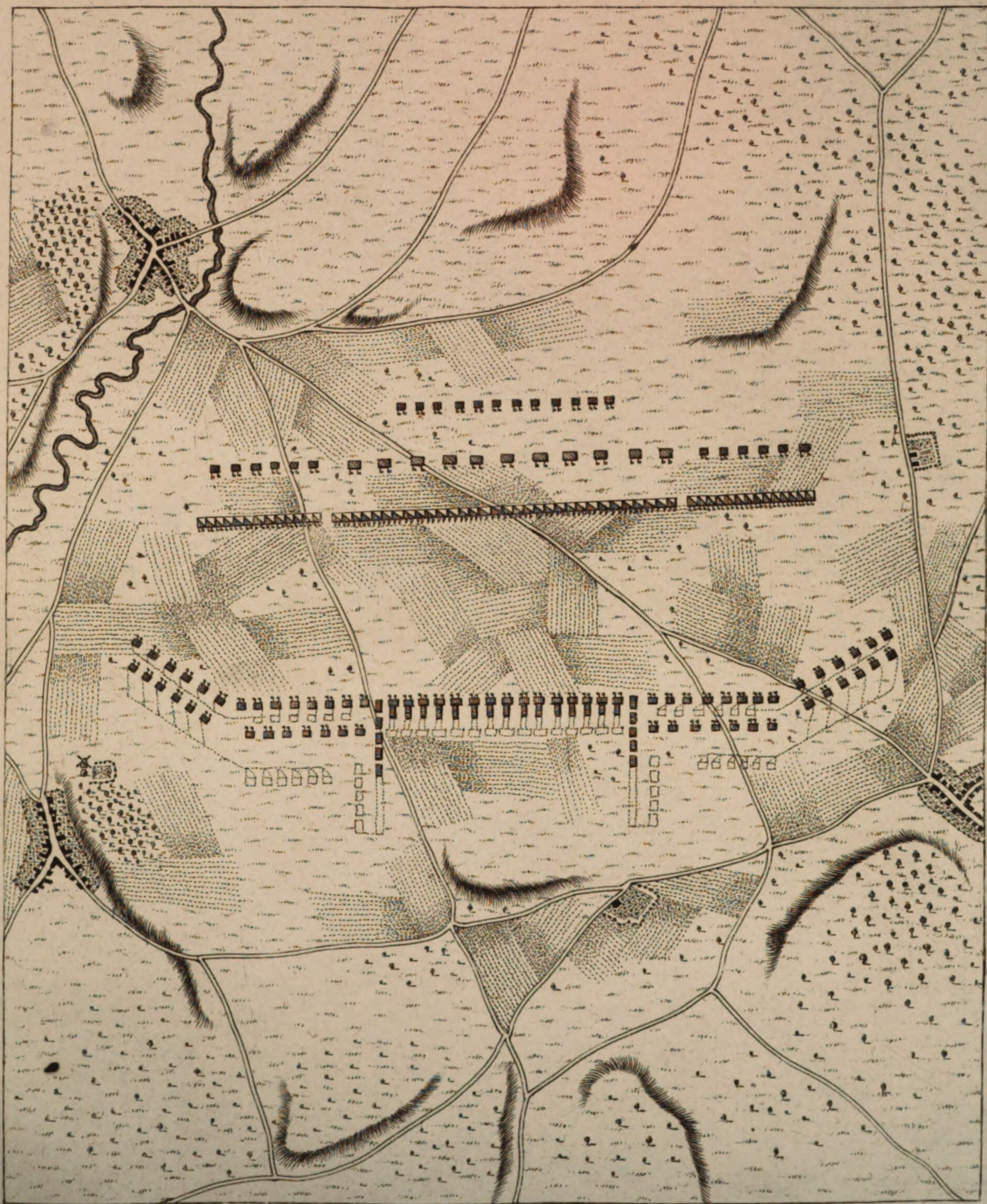
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WAR.

Plan of an Order of Battle, IInd Disposition.

Plate DXXI.



Scale of $\frac{1}{2}$ a League

30 300 600 1200 T.

A. Bell. Prin. Wal. Sculptor fecit.

WAR.

Plan of an Order of Battle, III.^d Disposition.

Plate DXXII.



Scale of $\frac{1}{2}$ a League.
300 600 1200 f.

A. Bell Del. J. M. D. Vulpes fecit.

Offensive Operations. thrown across the Vistula, the wood which had been made use of being too weak, and the timber-work ill secured, the bridge broke down whilst the king was passing. Charles, the prince of Wirtemberg, and many others, fell into the water: the king, having caught hold of a piece of the timber that was floating, was carried away by the current. The troops which had already passed found themselves at the enemy's mercy, who might have destroyed them; but they did nothing, says the historian Nordberg, because of the heights of which the Swedes were in possession, and from whence they kept a fire upon the Saxons. Was it not rather an instance of the good fortune which usually attended that intrepid prince?

It is probable, when a river is passed upon bridges in presence of the enemy, that they have been built before his arrival, and consequently there has been time to entrench them at each end, but particularly on that side next the enemy. These entrenchments should be made in such a manner as to prevent the bridges from being flanked by the enemy's cannon; therefore, instead of the entrenchments usual at the heads of the bridge, such as a horn-work, a crown-work, or a half-moon, the general should cause redoubts to be thrown up, the farthest of which should be 400 yards distance, and opposite to the bridge; and the others should be thrown up nearer to the banks of the river, forming a semicircle: in order for their better defence, the general should follow the same dispositions which have been laid down in the preceding part. If there are many bridges, they should be constructed as near each other as possible, that the same redoubts may equally serve to cover them: the reason of these redoubts being placed at a distance from the bridges is, that, as the troops pass, they may have room to form, and sustain those occupying the redoubts. These redoubts, it must be acknowledged, require a greater degree of labour than is requisite for the construction of a half-moon, or even a crown-work; but it seems impossible to pass a river upon bridges in presence of an enemy, however strongly they may be entrenched, if there is not space enough left between the entrenchments and the bridges to contain a number of troops sufficient to oppose the enemy, and to give time for the remainder of the army to pass. Labour should never be considered when an enterprise is successful; a general, therefore, should never spare any pains for the attainment of his ends, but should take every precaution necessary for success, without troubling himself about the time and the labour it will cost: the glory of having forced the enemy to leave the passage open to him makes sufficient amends for the trouble he has given himself in order to attain it.

Suppose an army of 60,000 men would pass a river, guarded by an army of 40,000. Let it also be supposed, that the army intending to pass has got the start of the enemy, either because he was not yet arrived, or because he has been amused with marches and counter-marches; that the general has also had time to construct three bridges, and to entrench them in the manner above-mentioned: he must begin the passage by causing the redoubts to be occupied by a battalion, or half a battalion, according to their size; and he must plant cannon between those redoubts, with infantry to guard them. These dispositions being made, the army must march in three columns; the centre column must be entirely infantry, and the other two composed of infantry and cavalry. As the infantry passes the bridges, it must divide, and form columns, consisting of four battalions each, which must pass between the redoubts, having cannon upon their flanks: the cavalry must pass to the right and left through the interval of the two redoubts nearest the river, and form in order of battle upon the flanks of the columns; the right wing with its right towards the ri-

ver, and the left with its left. When all these columns shall be formed, and ready to march towards the enemy, the right and left of the two lines of cavalry must sustain it; and the right of those of the right, as well as the left of those of the left, will march to put themselves in a line in presence of the enemy: in this position the army must march towards the enemy, and attack him, if he is so rash as to hazard an action; and if he should retire before the army is entirely passed, the passage will be the more easily effected.

See Plate DXIX. fig. 2. where A A A are bridges of boats. B, Redoubts which cover the bridges. C, A battery, under cover of which the infantry work at the construction of the redoubts. D, A battery to prevent the enemy from annoying the army on its march. E, The march of the army. F, The artillery distributed among the brigades of infantry. G, Infantry, forming in columns to open on the opposite side through the intervals of the redoubts. H, March of the columns into the front of the redoubts, where they halt in order to give time for a part of the cavalry to form upon its flanks. I, A battery erected to facilitate the forming of the cavalry. K, Cavalry, which, in gaining the opposite shore, forms in order of battle, and posts itself upon the flanks of the infantry. L, Eight battalions in column upon the right wing of the army, to go and examine the village, and attack the enemy in it, in case he should be possessed of it. M, Hussars and dragoons, who have taken possession of the height which is on the left wing of the army. N, A brigade of infantry posted next the height, covering the left wing of the cavalry. O, The disposition of the army marching up to the enemy.

From this disposition it appears, that the army which attempts the passage is almost certain of succeeding; it is sheltered behind the redoubts during the passage of the bridges; it has ground to form itself upon, and to show itself in full strength. But it is seldom that a general has time to build the bridges and entrench them after this manner, when the enemy is on the opposite side with an intention of disputing the passage: so circumstanced, he must endeavour to find some fords, and, under shelter of one or more islands, construct a number of rafts behind them; he must endeavour to keep the enemy at a distance from those places by marches and counter-marches; and when that is done, he must cause the cavalry to ford over with grenadiers and labourers behind them; these labourers must throw up entrenchments as fast as they can, whilst fresh infantry is caused to pass over upon rafts. Provided these entrenchments can stop the enemy for some time, and contain infantry enough to resist him, the remainder of the army will be very soon passed: the cavalry will at the same time pass at the fords which have been discovered, in order to cover the flanks of the infantry; when it will spread over the plain, being itself protected by the infantry, as it leaves the entrenchments in columns.

The passage of a river cannot be safely attempted, if the general does not provide for a defence, and take infinite precautions to protect the army in its passage.

All that authors have said upon this subject, arises from this principle of Vegetius, which they seem to have commented upon, and to which they have applied different examples. "As the enemy (says he) are accustomed to form ambuscades, or to attack openly at the passage of rivers, the general should possess himself beforehand of a good post on the opposite side, and entrench himself even on that on which he already is, to hinder the enemy from attacking his troops, separated by the channel of the river; and still, in order for greater security, the general should cause the two posts to be entrenched and well palliaded, that in case of

Offensive Operations: an attack; he may be able to sustain the efforts of the enemy without great loss."

It may not be improper, in this place, to relate a disposition of M. de Valiere's, formed upon this principle.

He says, "After the cannon are planted, a parapet should be raised upon the banks of the river, 200 yards in length or thereabouts, behind which some infantry should be immediately launched from the centre of the parapet, and some soldiers with labourers sent over, who must immediately erect a small half-moon: as soon as that is done, more soldiers should be sent in order to defend it in case it should be attacked; more labourers should also be sent to erect another half-moon, both upon the right and the left.

"If the labourers are not annoyed by the enemy, they should at the same time erect an horn-work, whose wings should be flanked by the first parapet, and the cannon planted in it: if the river is so large that the wing of the horn-work cannot be defended by musquetry, it must be defended from the half-moon, made from thence to the water."

In the mean time, the general should cause the bridge to be continually worked at; and, as soon as it is finished, make the troops pass over it, if the enemy is not in sight; but if he is, the horn-work must be completed, to prevent the enemy from falling upon the troops as they pass. The horn-work being made as strong as is judged necessary, as much infantry as it will hold should be lodged in it, with some field-pieces; and as the cannon upon the rising will keep the enemy at a distance, the general may order the cavalry to pass: but still all this cannot be effected but before an army very inferior. If the enemy's army is of superior force, the safest method is to try a passage at some farther distance, still keeping the army in sight as long as possible, and concealing from the enemy that any troops have been detached.

It is impossible to foresee every stratagem that may be employed, as they depend upon many circumstances; but it is always right to send, if possible, some trusty spy to discover the enemy's position on the other side of the river, what obstacles he can place in the passage, what methods are to be used to avoid them, and what parts of the bank are most accessible or best guarded.

A general should make many false attempts, particularly at those parts where he least intends passing; they should be made as secretly as possible; and also, in order to deceive the enemy, the general may throw over two or three bridges at hazard, in sight of the enemy, at those very places where he has resolved not to pass: the enemy's whole attention will be directed to that side; and a constant fire should be made on him from the other side, so that he may not be mistrustful of the stratagem. There is no doubt of these bridges being taken, which is of no consequence, provided the enemy is amused, and the general has time to throw over another bridge at a distance from that place, by which he can pass.

We cannot pretend to recapitulate every stratagem which a general may practise: in the histories of prince Eugene and Charles XII. the reader may see the different methods which they made use of; it will be sufficient here to relate the rules laid down by Montecuculi, with some modern examples, by which they seem to be corroborated.

1. The general must plant artillery upon the bank opposite to the post he intends taking; which will be attended with great advantage, if the river forms a re-entering angle, and if there is any ford near it. 2. In proportion as the construction of the bridge advances, he should post some infantry upon it, in order to keep a fire upon the opposite shore. 3. When the bridge is completed, he must cause a body of infantry, some cavalry, some field-pieces, and some

pioneers, to pass it, in order to fortify the head of the bridge on the other side. 4. The general must take great care that the enemy has not posted armed barks, or other machines, to break down the bridge when half the army shall be passed. 5. If the general would preserve the bridge, he must fortify it at both ends, and place sufficient guards in it.

In 1743, prince Charles intending to pass the Rhine, kept a continual fire upon all the French posts from 11 o'clock at night till three in the morning, in order to conceal his real design with regard to the passage. Marshal de Coigny assembled his army in three large bodies, and lay all night upon his arms, the only prudent step he could take on that occasion. By this disposition he found himself in a condition of transporting himself opposite to the isle of Raignac, of which the enemy was in possession; and it is well known that they ended the campaign there, without being able to penetrate into Alsace.

The number of columns ought to be regulated by the breadth of the ford, or by the number of bridges that are established.

The third of June 1747, at day-break, the army commanded by M. de Belleisle passed the Var in five columns. This passage was effected without any resistance on the part of the enemy, and M. Belleisle had 15 men drowned, although there was a chain formed of peasants, acquainted with the fords, to direct the march of the columns, and to assist the soldiers who were carried away by the rapidity of the current.

III. All passages of this nature, whether in a march, in defence, or for an attack, may be foreseen. A general may, at a distance, make all the preparations necessary for these operations; he may anticipate or foresee the dispositions of the enemy: in regard to a retreat it is otherwise; for although it may have been provided for, a general cannot be certain whether it can be effected after the manner he hath intended; besides, he must, in a retreat, unite all the different dispositions already mentioned: the least negligence becomes irreparable, and gives the enemy a very great advantage. A moment lost, a movement discovered, may also be the cause of a rout, and render the retreat impossible, or at least very bloody; therefore if a general, in these circumstances, has not a perfect knowledge of the river he has to pass, if he has not been careful to preserve the bridges, or to keep the materials and instruments proper for the throwing over of new ones, he will be unable to pass in sight of the enemy. Xenophon's retreat with the 10,000 Greeks, furnishes examples of the passages of rivers, which a general should always have present to his view. What prudence, what activity in sounding the fords himself, whenever he met with any stream or river to be crossed! What orders to prevent confusion among his troops, and what stratagems to avoid being repulsed!

If a general is certain of returning by the same place at which he has formerly passed, the best way would be, as Vegetius says, to have the bridges guarded, and to erect a fort with large ditches at the head of each, for their security, and to place troops in it to guard the bridges and the passage, as long as shall be thought necessary.

Thus circumstanced, a general should entrench the heads of the bridges in the manner already directed; and that the troops may pass the bridges without confusion, according as one brigade of infantry shall enter the circle formed by the redoubts, another shall pass the bridge, and that which enters shall take possession of the posts which that which passes occupied; he must be careful to establish batteries of cannon to the right and the left, on the other side of the river, to flank the redoubts, and defend the approach to them; so

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so that when the whole army shall have passed, the troops who occupy the redoubts may retire with ease. The cavalry will pass the bridges without stopping behind the redoubts.

In a retreat of this kind, the infantry should march in column, and the cavalry in order of battle, upon the flanks of the infantry. Before the march is begun, some troops must be sent to occupy the redoubts; and as soon as they shall be in possession of them, the army will put itself in march, and proceed towards them. The cavalry of the right must pass over the bridge nearest to it, and that of the left will do the same. The columns of infantry must enter by the spaces which are between each redoubt; the grenadiers and the piquets must remain, in order to sustain the troops occupying the redoubts: some pieces of cannon should also be left to fire upon the enemy in case he should approach too near; the columns must pass over the three bridges; the grenadiers and the piquets must also draw near the head of the bridges at night-fall; the troops occupying the redoubts must quit them silently, and pass the bridges; they must be followed by the cannon that has been left during the day; the grenadiers must pass last of all; after they are passed, the bridges must be broke down. This may be easily executed, provided order and silence are preserved; but if the enemy entertains the least suspicion of the redoubts being abandoned, he will come in full strength to attack the troops still remaining on that side. These troops, too weak to resist a superior number, cannot avoid being beaten, slaughtered, or drowned, the cannon taken, and the bridges burnt.

For greater security, the grenadiers and the piquets may be furnished with chevaux-de-frise, which will make an entrenchment, till the troops which occupied the redoubts are retired. A retreat never merits the epithet of *fine*, except it is performed with order, and with the loss of as few brave men as possible, to save the rest of the army.

In every enterprise formed by a general in difficult places, he must, according to M. de la Valiere, provide for his retreat. In retreats of all kinds, adds the duke of Rohan, a general cannot be too attentive to render it safe, and to avoid disorder: when it is, the effect of his own choice, it ought to be made so early, and so expeditiously, that he may not be under a necessity of fighting.

During the passage of a river, or even after a general has passed it, if he should be repulsed, the retreat becomes very difficult, and cannot be performed without great loss; it is for that reason that many generals, who have been mistrustful of the firmness of their troops, have burnt their ships in the port, in order to animate them to victory, from considering the impossibility of retreating.

The following retreats by M. Saxe across rivers, will give the reader some notion how such enterprises should be conducted.

In the campaign of 1742, the disposition of that commander for passing the Danube owed its whole success to secrecy, to his address in profiting by circumstances, and particularly to a very thick fog.

The two armies were encamped two leagues distant from each other, and the light troops skirmished together the whole day. At seven o'clock at night, count Saxe sent for the general officers, furnished them with instructions, and caused the guards to be doubled. At nine o'clock, the baggage filed off over two bridges; one of rafts and another of piles: after which the infantry passed, and the grenadiers, who formed the rear-guard, cut down and burnt the two bridges. The enemy advanced in order to charge his rear-guard; but 18 pieces of cannon that had been planted beforehand, very soon silenced the fire of their

musketry, and he lost not a single man. At day-break the army formed in order of battle, upon two lines, in order to give time for the Imperialists to retire from Pladling; and as soon as they had joined, the army put itself in march in four columns.

It is particularly necessary, either in passages or retreats, to be acquainted with the nature of places, and if they are fit to furnish the timber necessary for making rafts and bridges. In Germany, and countries where wood is very plenty, in order to pass with greater expedition, a general can make use of rafts or flying bridges. (See *Flying BRIDGE*.) Two may be placed, one upon the right, the other on the left, of a bridge built upon piles; by which means three columns can pass at once. It should be observed, that the flying bridges are by no means secure against torrents.

In 1742, count Saxe having beforehand possessed himself of Thonau, caused two flying bridges of rafts, and a great work of redans, to be erected, in which he posted five battalions and some cannon.

On the 9th of September all the baggage passed the Danube: on the 10th the army put itself in order of battle in two lines, which retired successively toward the river. The lines passed one after the other; that is, the cavalry at the ford, and the infantry upon the flying bridges.—Six thousand of the enemy's advanced guard were witnesses of this retreat without daring to molest it; so prudently were the orders given, and so exactly executed.

It is in retreats that bridges are most liable to break under the weight of the troops; it is at that time the precautions are neglected, because the danger becomes more pressing, and they are not sufficiently acquainted with the rivers over which the bridges are thrown.

SECT. XI. Of Battles.

Of all the operations of a campaign, the most important, and that which is most deserving of attention, is a battle, because it is generally decisive; every other operation is but preparatory to, or consequent of it. A general engagement, says Vegetius, is often decided in two or three hours; after which there scarcely remains any resource for the vanquished. Battles, says M. de Montecuculi, bestow and take away crowns; from their decisions princes cannot appeal; by them war is put an end to, and the name of the conqueror immortalized.

A general should by no means suffer himself to be forced to a battle; neither should he offer it but when there is a real necessity for it; and even when he gives battle, it should be rather with an intention of saving than shedding blood; more with a view of asserting the rights of his master, and the glory of his country, than of oppressing mankind. However bloody a battle may be, it is always less so than a long war; which, by reiterated troubles, consumes the treasures of sovereigns, that sinew of a state, and drains the blood of the subjects.

Nevertheless, there are some occasions where it is not left to a general's choice, either to give or accept of battle. An army of observation, and an army acting on the defensive, neither can nor ought to be desirous of coming to action. Both the one and the other should have no other object in view, than that of posting itself in so advantageous a situation, that the enemy may neither entertain a thought of attacking it in its camp, or any hope of forcing it. The army of observation, whose only object is to protect, or to cover the troops forming a siege, should never seek to fight the enemy, unless attacked by him: the other, obliged by its want of strength to act upon the defensive, should only be desirous

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desirous of occupying advantageous posts, to prevent the enemy's penetrating into the country, and attacking it in any position it shall have taken.

If the choice is left to the general, he ought to be particularly careful, before he comes to a resolution of giving battle, to examine whether he can gain greater advantage by winning it, than he will sustain damage by losing it.

It is therefore neither caprice, nor a mistaken courage, or the desire of distinguishing himself at an improper time, that should determine a general to give battle; but his superiority over the enemy, both in the number and quality of troops, the enemy's incapacity, his ill-chosen encampments and negligent marches, the necessity of succouring a place, or the certainty of a reinforcement, by the junction of which the enemy will become superior, or circumstances which may change the original designs of the campaign. This was the reason which induced the viscount Turenne, in 1674, to give the battle of Einsheim, because the prince of Bournonville waited the arrival of the elector of Brandenburg, who was coming to join him with a considerable reinforcement; and if he had not given battle before that junction, the enemy's army would have had a very great superiority over his. The reasons given by Montecuculi for avoiding a battle are, "when the loss of it will be more prejudicial than the gaining will be advantageous; when inferior to the enemy, or when succour is expected; when the enemy has the advantage of the ground; when it is perceived the army is working its own ruin, either by the fault or division of the commanders, or through the disagreement of confederates." It may also be added, when the enemy's army labours under some disease; when it is in want of provisions and forage; and that, disheartened by these circumstances, his troops desert from him.

It is on a day of battle that it becomes particularly necessary for a general to be acquainted with his own ground, and also that which is occupied by the enemy; to know in what manner his wings are supported, the nature of the places where these supports are; whether he can be surrounded, and in what part he can be attacked with the greatest facility.

But however essential these branches of knowledge may be, it is not always the superiority of number, or quality of the troops, or advantage of ground, that will secure the best disposed army from being routed: it is the foresight of the general in the precautions he has taken before the battle; it is his genius, his activity, his coolness, in the time of action, and the capacity of the general officers acting under him, that determine the success.

Ground, seemingly the most advantageous, often presents obstacles, which do not immediately strike a general, although an experienced one, and which may prove fatal in the course of a battle; how, therefore, will a general be able to correct these mistakes, if he considers them as only trivial? At the battle of Cerignoli, fought on the 28th of April 1503, the enemy's front being more extended than at first it was supposed to be, in order to give a greater extent to that of the French army, it was necessary to continue the lines across vineyards and thickets; by which means, the neglecting to fill up a ditch caused the defeat of the French, and the death of M. de Numours their general.

A general should not always pursue his own opinion, it being impossible for one man to see every thing; he should, therefore, cause an exact account to be given to him of whatever he cannot have an opportunity of seeing personally; to inform himself by spies of the enemy's order of battle, and act in consequence of that knowledge; he should possess himself of all places capable of containing ambuscades, which he ought to have had examined some days before the battle.

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Santa Cruz hath given a particular detail of all these preparations.

It is in these moments, which decide the fate of nations, that the genius and prudence of a general ought to be conspicuous; he should see, at the same time, what is doing among his own and the enemy's troops. Beside the precautions which ought to have preceded the day of battle, those which ought to be taken in the course of the action are so numerous, that it is impossible for them all to find a place here.

Some depend upon the general's ability, others upon circumstances, which it is almost as difficult to describe, as to mark out the necessary dispositions for them.

It depends upon the general's genius and foresight to make choice of intelligent, active, and prudent aids-de-camp, to assign to each particular body the properest commander; not, for example, to place, at the head of infantry, one who has been long accustomed to the service of the cavalry; or, at the head of cavalry, one who is more used to the infantry, &c.; to encourage the soldiers by the hope of rewards, and by motives which may spirit them up, and to threaten those who are so unmanly as to tremble at the sight of an enemy, or rash enough to run forwards without order.

The general should also be capable of forming new schemes, in order to render those of the enemy abortive; he should also take care, whatever may be the nature of the country, to dispose his army after such a manner, as to render it equally strong in every part, that all the bodies of which it is composed may protect and assist one another without confusion; that the intervals necessary for acting be well preserved, and that the reserve can easily march wherever it shall be ordered: in a word, the troops should be disposed after such a manner, that even before the action they may perceive in what manner they are to act.

It is the work of genius to take advantage of circumstances, and to submit to them; it is impossible to foresee the precautions dependent on them, as the very circumstances must be themselves unforeseen: it is by a general's address, in knowing how to profit by circumstances, that he shows his superiority in the day of battle. M. de Montecuculi reduces all the advantages that can be gained over an enemy to four principal heads, which, in reality, are of themselves reduced to the knowledge of profiting by circumstances; such are the advantages of number, when the enemy is beaten in his posts, his convoys, and in his forages; when an ambuscade is surrounded, or when a whole army falls upon a small, weak, and separated body: the second head consists in the knowledge of the commander; the third in the manner of fighting; and the fourth in the advantage of the ground. A general, who properly considers these heads, will dispose of a combined army after such a manner, that it may, at the same time, receive orders without mistake, and execute them without confusion; a very necessary precaution, and one which Hanno, general of the Carthaginians, neglected to take with regard to the strangers allied with them, which occasioned the troubles related by Polybius. He should have mixed the soldiers belonging to those countries, where bravery is in a manner natural to them, with those belonging to countries where it is more extraordinary.

Vigotius points out the precautions necessary to be taken by a general, to avoid having either the wind or the sun in his front. The wind, which raised the dust, and blew it into the eyes of the Romans, contributed to the loss of the battle of Cannæ: the sun, on the other hand, dazzles the soldiers, and lays open their dispositions and evolutions to the enemy: in a word, the general should not neglect even those

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In the treatise written by Santa Cruz, upon the dispositions before and after a battle, may be seen a long detail of the precautions depending upon genius, and of those which are regulated by circumstances.

The general's post during the action ought to be, according to Vegetius, on the right wing, between the cavalry and the infantry. Onozander fixes it upon some height, and Santa Cruz towards the centre, in the front of the second line. Titus Livius and Polybius have observed, that the posts of Scipio and Hannibal were always in those parts which were least exposed: because, as observed by Onozander, a general who runs into danger is a rash man, fuller of presumption than courage: neither is daringness, adds his commentator after Plato, always a sign of courage; besides, a man who is really brave, is never daring but when it is absolutely necessary.

A general should not always suppose that what particularly strikes him is right; he should reason calmly upon the probability of it, in order to come to a greater degree of certainty with regard to the practicability: he ought also, says Vegetius, to be acquainted with the nature of the enemy, and the characters of his generals, whether they are prudent or rash, daring or timid; whether they fight upon principles or at hazard: in effect, a general ought to be earlier or later in making an attack in proportion to the rashness of the enemy. If, says M. de Montecuculi, any sign of fear or confusion is perceived among the enemy, which will be known when the ranks are disordered, when the troops mix together in the intervals, when the colours wave about, and the pikes shake all at the same time, then he should charge and pursue the enemy without giving him time for recollection: some dragoons, light cavalry, platoons, some loose troops, should be sent forward; who, whilst the army advances in order of battle, will go before to seize some posts into which the enemy must fall. A general ought also, says Vegetius, to sound the spirit of his soldiers, and observe whether they have a firmer countenance than the enemy. It is dangerous to lead an army on to action that is not thoroughly determined to do its duty. "Battles," says Vegetius elsewhere, "are generally won by a small number of men." The great mystery consists in the general's knowing how to choose them, to post them well, conformable to his plan, and the services required of them.

I cannot assign the reason (says he) why particular bodies fight better against other particular ones, or why those who have beat bodies stronger than themselves, have in their turn been often beaten by those that were weaker: It is undoubtedly owing to want of confidence; because the place

of action has been different; or from other circumstances which cannot be laid hold of, but on the very instant. The situation of the mind is shown in the countenance of the soldiers; it is declared in their discourse, and by the most trifling of their actions. The general should consult them; he ought even to go farther—the best countenance is not always a sign of the firmest courage. Cowardice often conceals itself under the mask of intrepidity; but soon as the action begins, the veil falls off, and the coward shows himself, notwithstanding all his endeavours to the contrary. Neither at this time should a proper degree of fear be thought blameable; nature must be allowed to shrink in that awful and uncertain situation: the coward gives himself up to his fears; the bully seeks in vain to dissemble them; and the rash man, who cannot distinguish between danger and safety, is sensible of both; the real soldier is always modest, and contented with having done his duty. A good general turns every thing, even want of strength, to advantage. Hannibal, at the battle of Cannæ, posted his best troops upon the wings, that the centre, which was composed of those on whom he had the least dependence, might be the sooner broke, in order to give the wings an opportunity of surrounding the Romans.

It also requires a very strict examination in a general, in order to be thoroughly master of the circumstances on which he should regulate his dispositions; and he will also find it sometimes necessary to make some change in his original intentions. It is always proper that the corps of reserve should be composed of veterans, and even of part of the flower of the army; for should the army happen to be broke, this reserve alone may probably give a new face to the action: it was this method which Hannibal pursued at the battle of Zama; where Scipio, after having defeated the troops which presented themselves to him, was astonished to find he had a new army to fight with. At the battle of Fontenoy, the household troops placed in reserve, with some brigades of infantry, determined the success of the day. Nevertheless, on some occasions this disposition may prove disadvantageous; as, for instance, where it would be necessary to present a large front to the enemy, or where it is necessary to prevent his getting possession of a pass or a defile; where a general finds himself too inferior, and where there are also posts to be defended.

It would be unnecessary to repeat every thing mentioned by Vegetius, relative to the precautions necessary to be taken before a battle; time, and the difference of weapons, have greatly altered dispositions: fire-arms, which are now made use of instead of darts and slings, and the bayonet instead of the pike, have contracted the intervals which must necessarily be left between every soldier.

The order and disposition of troops for action depend entirely upon the general, who knows how to profit by circumstances; the just execution of them depends upon the capacity of the general officers. The general cannot be everywhere, or see every thing; he is obliged to rely upon the understanding of those who command under him for the just execution of his orders; the general officers should know how to vary them, in proportion as circumstances, and the situation of the enemy changes. They should have an exactness and quickness of eye, both to oppose and profit by them; and, as M. de Puysegur observes, the disposition of the troops being once regulated by that of the enemy, by the situation of the country, and the general orders that have been delivered, the only part the general can have in the action lies in those places where he is within reach of giving orders himself.

M. de Montecuculi with great reason observes, that there cannot be too many officers in an army on the day of battle,

in order to supply the places of those who are killed: but can a man possessed of any degree of humanity approve of what he adds, that this number should be increased in time of war, and reduced in time of peace? What a prospect for a soldier, who, after having lavished his blood for the safety of his country, and the glory of his prince, sees himself exposed to the fate of Belisarius! Whatever were the virtues of his master Justinian, can any one, without indignation, see this general, after having overcome the Persians, reunited Africa to the empire, punished the Vandals, driven the Goths out of Italy, ravaged Assyria, scattered at a distance from both empires that throng of barbarians by which they were over-run, and preserved the throne, and the life of the emperor; upon the bare suspicion, or rather under the pretence of a conspiracy, deprived of sight, and reduced to beg alms of passengers in the streets of that city which he had so often saved?

It has been already seen, that the dispositions in a mountainous country change according to the situation of the ground. Vegetius repeats, speaking of a field of battle, what has been so often established in the foregoing sections, that an open country is always most advantageous for an army that is strongest in cavalry; and that an enclosed spot, divided by ditches and marshes, covered with mountains and woods, is most convenient for infantry. In this last, the knowledge of the country, the art, the ability of the general, and the understanding of the general officers under his orders, sooner ascertain the success, than a superiority of troops in an open country, which presents little or no variety of ground, and which allows the greatest part, or indeed the whole, of the troops to act; the superiority in troops is attended with great advantage, provided also the disposition is good.

The different dispositions for troops are so many, the circumstances differ so greatly, that were it even possible to connect in one body only all the battles which have been fought since the time mankind resolved to regulate their properties by the law of the strongest, the number of contrivances which remained to be collected would be greater than of those which have been actually executed. It is impossible to give a detail of every thing; for in that case every particular spot, and the disposition proper for it, every country, and all the circumstances that may oblige these dispositions to vary, must be described. Those now going to be mentioned, are only with a view of giving the rules, and of more clearly demonstrating those precepts which lead to the knowledge of all others.

DISP. I. Let two armies of equal force be supposed, in an open country divided by a river, consisting of 57 battalions and 72 squadrons each, cavalry, hussars, and dragoons. The two armies are on the same side, the right of the one, and the left of the other, to the river. The left of the army whose right is to the river is unsupported; and that whose left is supported, has a wood on its right. By this disposition may be seen the necessity of covering the wing of the army A, that is exposed. Plate DXX.

The army I, whose right and left are supported, is formed upon two lines, and presents the same front as the army A, with a reserve in the rear. The following is therefore thought to be nearly the disposition which should be made by the general commanding the army whose left is unsupported. The first line ought to consist of 20 battalions, with intervals of about three toises between each battalion; 12 squadrons on the right, with their proper intervals; four battalions on the right of the cavalry, 10 pieces of cannon, and a battalion in column close to the river; 12 squadrons on the left of the first line, with their proper intervals; 16 battalions in the second line, 300 paces distance from

the first; 11 squadrons on its right, placed behind the intervals of those in the first line; and on their right, six squadrons of dragoons next the river, in order to sustain the infantry and cannon covering the right; 11 squadrons on the left, placed in the same manner as those on the right; 10 pieces of cannon, supported by a battalion in column, between the infantry and the cavalry of the right; 10 others, supported also by a battalion between the infantry and the cavalry of the left; four battalions in the rear of the second line on the left, with orders to transport itself obliquely, or sidewise, as soon as the army moves to attack that which is drawn up against it; 12 squadrons of cavalry in the rear of the first line upon the left, to post themselves obliquely upon the flank, at 100 paces distance from the first squadron on the left, next to the four battalions and the cannon; the reserve, consisting of 10 battalions and eight squadrons of dragoons, in the third line upon the left flank, so that it may fall into the first line as soon as the squadrons of cavalry, which were in the rear of those of the first line, shall be posted obliquely: in this position, the army will move forward, the right never quitting the banks of the river.

If the enemy's army should advance, the disposition of the army A will become still better, because the army I will quit the support it had on its right; but if, on the contrary, it remains in its post, in order to keep this support, then the 10 battalions of the reserve, followed by the eight squadrons of dragoons, will join the four which support the flanks of the cavalry which is posted obliquely. When marching, this line posted sidewise should proceed obliquely; and when the cannon shall be near enough to cannonade with effect, it should make several discharges, in order to break and beat down the entrenchments, or felled trees, which the enemy may have made, and also to destroy their disposition. As soon as the army A shall be near enough to cannonade the army I with success, it must halt, and amuse it with a continual fire of the cannon. The principal attack ought to be made at the wood by the 14 battalions: in order to give more strength and certainty to this attack, six other battalions, with 10 pieces of cannon, should be detached to it from the second line, always keeping up a fire from the front. If during this attack, it is perceived that the enemy weakens his line, in order to carry assistance to the wood that is attacked, then the centre and the right of the army should march up and charge him briskly. The troops who cannonade the wood ought not to advance, but should only keep the troops posted in it at bay; because that part which the enemy has weakened will then become the principal object of attack: it is probable, that the enemy having weakened his front, will certainly be broke. If the enemy should not weaken his front, and the attack of the wood should succeed, as soon as the enemy is driven out of it, the troops which attacked it should take the enemy in flank; then the body of the army, by advancing, ought to determine an affair already half gained. If by the intelligence the general hath received, and the number which he knows the enemy's army to consist of, and which he sees before him, he judges the wood is filled with infantry, and that consequently the attack of it will be attended with difficulty, he must attack on the side of the river, by marching by degrees from the right, as if to sustain the left. For the greater certainty of succeeding in this attack, he should reinforce the five battalions upon the right with some others from the second line: the left should continue in the position already mentioned, to keep back the enemy. If it should happen that the enemy, seeing his left attacked, causes the troops to leave the wood in order to replace those of the centre, which he caused to march to the assistance of the left, the 14 battalions which

which are posted sidewise, ought briskly to attack the wood sustained by dragoons. These last should post themselves upon the left flank of the infantry in order to cover it; and as soon as it shall be within 60 paces of the enemy, it should march up to him with bayonets fixed; and the dragoons ought to attack him in flank at the time the infantry does the same in head. The wood is all this while supposed to be practicable for the dragoons on horseback; but in case it should not be so, they must dismount, the infantry being sufficiently supported by the 12 squadrons of cavalry, which are placed sidewise.

The general may with ease, especially in an open country, attack the enemy's whole army together; but this may be attended with great danger, and if the whole front of the first line is broken, there will not be much difficulty in breaking the second: whereas, by attacking the enemy's army in one or two parts, if one of these attacks succeeds, the battle is won; because the troops who are victorious, take the enemy in flank, at the same time that he is attacked in head by the rest of the army. In case it should not succeed, the troops who made the attack can retreat, protected by the whole army, which hath not at all suffered.

The general should, as much as possible, conceal the motions he intends making from the enemy; consequently the five battalions and 10 pieces of cannon which support the right of the army next the river ought to march in the rear of the squadrons of the first line. the infantry with their arms secured, and not range themselves in the order of battle intended, till the two armies are ready to march to charge each other. It is the same with regard to the squadrons of cavalry, which should be posted behind those of the first line, to execute the design already laid down.

DISP. II. If the two armies are not supported either on their right or their left, the same position should subsist that hath already been established for the cavalry, which is in the rear of that belonging to the first line, except that it should be distributed on the right and the left. If there is not cavalry sufficient, hussars must be substituted in its place; but if there should be cavalry enough, it must be used on this occasion; because cavalry being a greater body, its charge is heavier, and it also makes a greater impression upon other cavalry opposed to it, provided they execute their order with great quickness. This cavalry or hussars, which are posted sidewise, should not quit their post, but wait the success of the attack. If the enemy is repulsed, they must then fall upon his flanks, and by a brisk and vigorous charge endeavour to involve the second line in the confusion of the first; they will be followed by part of the wing of cavalry that is victorious, in order to give a greater force to the attack of the second line, taking as much care as possible not to leave any body of cavalry upon the wing of infantry that is in a condition of protecting it. After these two lines of cavalry have been broken and pursued, half of the victorious line should remain in order of battle; and, by a motion to the right from the left, take the enemy's infantry in flank, at the same time that it is attacked in head by the infantry of the army. The second line should then move into the place of the first, in order to be near enough to assist it in case the enemy's infantry should stand its ground firmly; but it is probable, that being deprived of its cavalry, it will neither have the same firmness, nor the same spirit, as if it was supported, especially when it is attacked on every side.

The cavalry and the hussars who pursue the beaten wing should not expose themselves too much, or break their order in the pursuit, for fear the enemy's hussars which are behind should fall upon and beat them by attacking them on all sides; which may very probably happen, if they do not

take care to keep in order of battle; which should at least be attended to by the cavalry. After the hussars have pursued the enemy's cavalry so long as to entirely disorder them, they should return and take their former posts, in order to march from thence to whatever place they may be serviceable. Although it may appear something hard to make the hussars return, there is nothing so difficult but what may be accomplished, when order and discipline are firmly established, and when an officer has the art of making himself obeyed.

At the battle of Cannæ, the Carthaginian cavalry, superior to that of the Romans, having broke through them, one part continued the pursuit, and the other fell upon the rear and the flanks of their infantry; at the same time the Carthaginian infantry charged that of the Romans in all parts, which decided the victory. Thus Hannibal owed his victory partly to his superiority in cavalry, and to his attack upon the flanks. The Numidians, who were upon the right wing of the Carthaginian army, and who fought nearly in the same manner as the hussars, performed on this occasion the same service as the hussars would certainly do in the disposition now before us; so true it is, that infantry, destitute of its cavalry, hath no longer the same firmness, nor the same spirit; and if it is also attacked in head by infantry, it cannot avoid being beat. The principal attention of a general, says M. de Montecuculi, ought to be to secure the flanks; experience having taught, that when the wings of cavalry are broke, the infantry is easily surrounded, and hath no longer the means, nor even the courage, of defending itself. The reader may see the principles he lays down upon that subject. It is seen by the example of the battle of Cannæ, what use the cavalry ought to be put to, particularly in an open country where it can easily act. What advantage may not be expected from it, when an army of Romans, 80,000 strong in infantry, and 6000 horse, was overcome by the Carthaginians, weaker by the half in infantry, but which derived its principal strength from 10,000 cavalry, all veterans, and well disciplined.

But if the wing of cavalry is beat, it ought to retreat with as much order as possible. The cavalry, or hussars, that are posted sidewise, should always continue in the same place; there is no reason to fear that the enemy will advance briskly to the pursuit; because he will be taken in flank by the body that is posted sidewise; a circumstance which ought not only to abate the eagerness of the conquerors, but also animate the conquered. By this manner of acting they gain time to pass through the intervals of the second line, and to rally in the rear of it, which they can perform with the greater ease, as they are neither pursued nor molested, at least but very slightly.

In order to prevent the inconveniences that may arise if the hussars in charging the first line of the enemy in flank are charged by the second, it is necessary to detach instantly from the reserve a body of dragoons sufficient to fill up the intervals of the hussars, which will form a full line without taking up more ground: this can be so much better effected, as there would be no ground on the other side of the troops who are posted sidewise, and that, besides, these troops would be at too great a distance from the main body of the army.

Again, without causing them to fill up the intervals of the hussars, they may be placed in a second line behind them; and when the hussars attack the flank of the enemy's wing, the dragoons will take their place, in order to keep back the enemy's second line. This method hath the same effect, and is performed with less difficulty. It is almost evident, that the second line will not dare advance to protect the first for fear of being charged in flank

by the dragoons, but that on the contrary it will be obliged to retreat.

This disposition, the performance of which appears very difficult, is not in reality so, if the general hath taken the necessary measures, and if his troops are well disciplined, and know how to move with order and exactness. Even when this motion is not performed with all the exactness possible, it can never be dangerous, because the front of the two lines will not be destroyed, and because it is also made upon the rear; and that if the dragoons and hussars are attacked and beat in marching up, their defeat cannot be any way prejudicial to the main body of the army.

When the field of battle is in an open country, all the troops generally come down, especially when there is no obstacle to prevent them. On these occasions, it is requisite that the disposition of the troops should be strong in every part; there should always be a reserve, whether of infantry or dragoons, in order to be ready to assist the troops which have suffered.

If it is possible, in an open country, to find any hollow to support the right, and a village to support the left, the general should make choice of that situation, supposing his intention is to accept, and not offer battle. If he designs to give battle, it would be unnecessary to take this position, because he must quit it in order to attack the enemy: but if circumstances require his accepting it, he must seize this post, and place infantry and cannon in the village, and station other infantry in the rear to support that which is in the village.

As to the disposition for the order of battle, especially for the front of the line, it must be regulated by the ground, by the disposition the enemy has taken, by the troops that can most easily act, and by those that the enemy can oppose to them.

If the enemy has pitched upon a field of battle, and the general would attack him in it, he should keep his whole front employed; but should make his chief efforts on one or two parts, upon the wings, or at the centre. This was the method practised by marshal Saxe in all his battles: when he accepted battle, as he was obliged to do at Fontenoy in 1745, he was in expectation that the opposite army would attack him on one side sooner than another; in this situation the dispositions should be properly regulated, the posts intrenched and occupied, the cannon distributed, and troops placed in the rear of each post to sustain those which are in it: victory should then be expected from the capacity of the commanders, the firmness of the troops, and the assistance that is properly given them. But when a general gives battle, he may attack either the right, the left, or the centre, always conforming to the situation of the ground, and the field of battle which the enemy has chosen, which cannot be ascertained but by a thorough knowledge of the country.

It is dangerous to attack the whole front of the opposite army with equal vivacity, because, if the attack does not succeed, the troops are disheartened, and are witnesses of each other's defeat. If the first line is repulsed, the second is seldom of any great use; whereas, by only employing the whole front of the enemy, and making a strong attack upon one or two parts, if it is successful, the troops can take the enemy in flank; and those which amused his front will then attack him briskly, and prevent him sending assistance to the troops that are beat. If the general does not succeed in the first attack, he can try it again with greater force, by causing the troops of the second line to march as was done at the battle of Lafeldt fought in 1747: the French troops being repulsed four times, M. Saxe sent them a reinforcement; these troops being united, carried

the village at the fifth attack, which determined the fate of the battle.

In a plain but inclosed country, a general can attack only part of an army. Antiquity furnishes many examples of this. Epaminondas, at the battle of Leuctra, attacked only the right of the Lacedemonian army, with a large column of infantry that formed his left; causing the right to be supported, and making the left march, the whole army, according to the opinion of the chevalier de Folard, wheeled. The battle of Mantinea, won by the same general, is also of the same nature; with this exception, that it was the centre of the Lacedemonian army that was attacked. These examples are only proposed as what may possibly happen, but which it would be dangerous to imitate on every occasion, and which should be pursued in circumstances only where a general expects great advantage from them.

As the cavalry can easily act in an open country, and be of great assistance to the infantry, all possible means should be used to contribute to the success of their attack; they should always be supported by troops in their rear. Cavalry is of great use, particularly where the two armies, from the situation of the country, find no obstacle to prevent their joining; and if the cavalry, as M. de Puysegur observes, is beat, even when the infantry of the same army is victorious, the best thing that can afterwards happen to it is, to retire in good order.

The ground so often varies, that even in an open country there are unevennesses, thickets, morasses, and hollows; in each of these situations the dispositions should be changed. If these thickets happen to be in the line of cavalry, and it can act there (for if it cannot, it would be a very great fault to place it in them), it should be intermixed with platoons of infantry, observing also not to take them from the main body of the army, but from the reserve, in order not to diminish the strength of the front; which should never be done on any occasion whatever, unless part of the army, either by its own or the enemy's position, cannot act offensively, by reason of some morass, hollow, or any other obstacle that the enemy may have placed before him; if, nevertheless, a general can take an advantageous position, by causing these thickets or these hedges to be occupied by infantry, he should give it the preference, to enable the cavalry to act with the greater facility.

The dispositions vary not only according to the situation of the ground, but also according to the general's views. Some draw up the battalions without intervals, or like a wall; others, with small intervals; others leave the distance of half a battalion between each; and others, in pursuance of the chevalier de Folard's method, place them in columns.

The first disposition is without doubt formidable as to infantry; but, as it has been already remarked, it is defective with regard to cavalry. In the third, the interval of half a battalion is too wide: it would require an immense tract of ground; besides, the battalions would not be near enough to have it in their power to protect each other. The second seems better, because the front is not so large, the battalions are more within reach of assisting each other, and have only the distance necessary to prevent their mixing confusedly together. The fourth is undoubtedly very good; but can a general promise himself, that the soldiers can always march at an equal pace together, and without stopping? The fire of the column is continual, it defends itself on all sides; but its oblique fire does not do much execution, and there are situations and spots where this position in column would be faulty. When it cannot approach the enemy, and is also exposed to his cannon, this disposition would be dangerous; because it is certain that cannon

cannon plays with much greater advantage upon depth than upon breadth: besides, not being able to get near the enemy, there are only the heads of the columns able to fire, and the rest remains inactive, exposed to the cannon. The position of the column is therefore only very good, when it can get up to the enemy and charge him.

The marshal de Puyfégur asserts, that an army in an open country, formed in two lines, the first of which is without intervals, ought of course to beat an army that is formed with intervals.

The reason he gives for it is plausible: it being certain, that a full line keeps itself much closer in marching; and that, charging the first line of the army that has intervals, it ought to have broke through it before the second line, which is 150 toises or 300 paces behind, can have time to come up to its assistance; which might very well happen, and examples of it may also be cited. But could not there be another disposition opposed to this disposition in wall, keeping the necessary intervals, not only capable of resisting it, but also stronger, whether by the position and arrangement of troops, or by the ready assistance they can give each other, without being confused in their motions?

Let two armies be supposed in a plain country, without support to the wings of either side, or without any obstacle that may prevent their getting up to each other. The enemy's army, as hath already been said, is in two lines; the first of which is formed in wall, both infantry and cavalry; the second is formed with large intervals, and a body of hussars in the rear. The army to be opposed to it is of equal force, and consists of 40 battalions and 54 squadrons, cavalry, hussars, and dragoons. The following seems to be nearly the manner in which it ought to act against the enemy, who is supposed to be drawn up in wall.

The first line of infantry composed of 15 battalions, has the distance of three toises between each battalion, and the distance of half a battalion between each brigade, eight squadrons on the right, and as many on the left, with their proper intervals: 15 battalions in the second line, 200 paces distant from the first, seven squadrons on the right, and the like number on the left, in the rear of the intervals of those of the first line, supporting the infantry of the second; 10 battalions in reserve in two columns, one of which in the rear of the squadrons on the right of the second line, and the other of the same force posted in the same manner on the left; 12 squadrons of dragoons in the rear of the second line, half on the right, half on the left; and 12 squadrons of cavalry, or hussars if there is not cavalry, in the rear of those of the first line.

By this disposition, the army appears to be ranged in two lines, with a reserve, and will leave no room for the enemy to doubt of the motions it may make in marching: this disposition will undoubtedly have that effect, and does not appear very formidable; but as soon as the two armies begin to move forward, the second line of infantry must advance as unperceived as possible, forming itself in columns by battalions, each of which, with its head to a battalion of the first line, will form as many T's. The 10 battalions in reserve, which form two columns of five battalions each, will march and fill up the space on the right and left, between the infantry and cavalry. The cavalry, or hussars, which are in the rear of the first line, one by a motion to the right, the other by a motion to the left, will post themselves sidewise, at 100 paces from the wings of the army; the dragoons must post themselves in the rear of them in a second line. This will be performed much easier marching, because it is not complicated; it is also performed in the rear, and the front of the first line is not put into disorder; and consequently, the enemy will not perceive it soon enough to change his position, and oppose the dispo-

sition which is presented to him. This first line, by this disposition, forming as many columns as there are battalions, of course ought to break through the enemy's army, which is in wall, but not above four deep, because the impression of a column ought to be much stronger than that of a battalion four or six deep. See Plate DXXI.

Supposing the wings of each T to give way, the battalions which penetrate there will find themselves between two columns hedged in with bayonets; the 10 battalions in reserve, which, according to this disposition, ought to join the right and the left of the infantry, should of course separate the two wings of the infantry, which are on the outside of the disposition in columns. Four battalions should remain in pursuit of them, and the two last take the line in flank, at the same time that it is attacked in head. The cavalry should charge the line which is in wall with great vigour; and the second line should follow it very close, but in good order: the cavalry, or hussars, which are posted sidewise, will attack it in flank, and the dragoons must remain in their post, in order to keep back the enemy's second line.

Whatever dispositions are made in the drawing up of an army, they should always have some object. A general should foresee all that may be done by the enemy, whose disposition he should always suppose to be a good one, and to which he should oppose one at least as strong, and always better if possible; he should particularly conceal from him the motions he intends making, or disguise them from him in such a manner, that he shall not have time to oppose them, or at least not readily enough: neither should a general be so near as to give the enemy an opportunity of discovering and profiting by the method he intends following.

The disposition of an army in wall is good; but in general only so with respect to infantry, because that body acting by itself requires but very little ground to retreat, or present itself to the enemy, or to make a motion to the right or to the left. But this same disposition is defective, and even hurtful for cavalry, unless there is a moral certainty of its getting the better: but as, with regard to war, a moral certainty would be a real presumption, this disposition of cavalry in wall would be dangerous, because it may be broke. If that which is opposed to it marches up to it resolutely without confusion, and without being afraid of that mass of cavalry, and charges it the first, sword in hand, how can it retire in order if it is broke, being as much straitened in its retreat as in its disposition? All the squadrons filling up the ground, it will neither be able to make any evolution, or to act; and if it retreats through the large intervals of the second line, it will carry it away with it in its flight: were there even six lines behind it, they would all be carried away, the second by the first, the third by the second, and so on with the others.

It is true that it may give the first charge, and consequently make those squadrons which have intervals give way; but as these last have more ground to act on, they can retreat with greater ease than those who have none, by passing through the intervals of the second line, which is not to be done by a line that hath no interval. They can rally in the rear, while the second will charge the line that is without interval, and which is already disunited by its first attack; even when these two lines are beaten, they can retire with greater ease, each squadron having ground enough to act upon. They will never be so much disordered as the line which has no interval, which cannot escape being cut in pieces if broke, or which can only find its safety in flight; whereas, those that have intervals can retire one after another, and in a soldier-like manner, sustaining each other.

Besides, in order to prevent the impetuosity of this cavalry.

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ry in wall, it appears that nothing is to be done but to post hussars, if there is not a sufficiency of horse, behind the squadrons of the first line, who, when the two armies begin to move forward in order to charge, will place themselves on the right and the left sidewise, 100 paces distant from the first lines of cavalry: by this position, they will be able to take the enemy's line in flank, whenever it comes to attack the cavalry. If a part of this line perceiving this motion, divides into two, one part to attack the line that has intervals, and the other the hussars, it is so much strength lost; consequently, the line with proper intervals has fewer troops to fight, and may expect to break them by giving the first charge. If the hussars should be beat, it is of no great consequence, the defeat of those troops never deciding the success of the battle: it is the body of the army the enemy must break, and not two regiments of hussars, which retreat with great ease from before cavalry, and rally and return to the attack as readily as they retired. But if, instead of hussars, cavalry can be posted there, the enemy's line, which is divided into two, will find itself obliged to fight upon equal terms: the certainty of success depends upon the quickness with which the enemy is attacked; and the more so, as he will be obliged to make a motion in the presence of troops already posted and ready to charge. If this line without intervals advances, without showing any attention to the hussars, in order to charge the cavalry, the hussars, at least a great part of them, ought to fall upon the flanks; and the dragoons, which are in the rear of them in reserve, should take their place, to keep back the enemy's second line, and to prevent the hussars from being taken in the rear.

These two dispositions are ideal. A general seldom chooses to fight upon a spot where the wings are void of support; and prevents the enemy, as much as possible, from getting possession of an advantageous post, or at least does not attack him when he cannot prevent him doing it, especially if the ground which he occupies is everywhere exposed; there are, nevertheless, circumstances where a general is obliged to fight, although not in a post strong by situation. By the two dispositions just now described, the order which would be most proper to be preserved for covering the wings, which may be exposed by the situation of the ground, has been endeavoured to be shown; it has been seen of what consequence it is for a general to know, and to secure all the heights, morasses, hollows, and every obstacle he may meet with. On occasions so important, a general should take the same precautions that he would use under the cannon of a place, if he found heights that overlooked the works; in which case he would not fail of constructing others more advanced, to prevent the enemy from getting there, and retarding their approaches.

If the duke of Savoy, at the battle of Marfaille, gained in 1698 by the French army, commanded by M. de Catinat, had been possessed of the heights of Piosaca, the two wings of that prince's army would have been supported; instead of which, his left wing was exposed. M. de Catinat, profiting from this fault, extended his right to the foot of those heights, of which he possessed himself, and outstretched the enemy's left: it was from these heights that the disorder in the duke of Savoy's army commenced; it soon communicated to the whole front, and got possession of the whole army: so true it is, that the most trifling object, being neglected, changes the order of things; that the least fault becomes essential; that confidence in the number and in the courage of the troops is often dangerous; and that having a contemptible opinion of an enemy is always fatal. The enemy, although inferior in troops, will soon attain a degree of superiority, if he has the advantage of ground.

Armies can engage in so many different positions, that it

is impossible to particularise all of them. In this section two armies have already been presented in an open country, without any support to their wing; two others have been posted, one of which is upon a spot advantageously situated, its two wings covered; the other hath only its right wing supported, and its left exposed. It has been endeavoured to give to that, whose left wing is unsupported, the greatest strength in its whole front that is possible, and by the disposition of the left wing it is both strong and secure; but there are such a variety of spots where two armies may meet, that it will suffice to know in general the advantages they may derive from their situation.

DISP. III. A third disposition very different from the two former is as follows. The enemy's army is supposed to be advantageously posted; it hath a hollow on its right, through which run the waters of an impassable morass, forming a rivulet. Its left is supported by a large town, crossed by a rivulet. In the centre is an height, capable of containing 12 battalions; in the front of it is a plain of 700 or 800 toises, which extends from its left to the cavalry on its right. Opposite to this cavalry the plain grows narrower, by reason of an height which reaches to the rivulet, and which the cavalry could not occupy, because the enemy hath taken possession of it during the night. The town is entrenched, and filled with infantry and artillery; 16 battalions in two lines are posted next the town, in order to sustain the troops that are in it. Behind the town there are three bridges upon the rivulet: in the front of the town, on the other side of the rivulet, are posted four battalions and five pieces of cannon, in order to flank the troops intending to attack the town: these four battalions are sustained by eight squadrons of dragoons. The centre of the army consists of 20 battalions in the first line, and as many in the second; eight of which are next to the morass, sustained by six squadrons of dragoons; 12 squadrons in the first line, and 12 in the second. The cavalry on the right consists of 11 squadrons in the first line, and 11 in the second. Thirty squadrons of hussars, distributed half on the right, and half on the left, and the whole front of the army lined with artillery. Plate DXXII.

The army A, which was encamped a quarter of a league from the height by which it is separated from the enemy, began its march at dark; it halted at the foot of the height, and sent some detachments of infantry to take possession of the summit of it. The army I made the above-mentioned dispositions, because the army A was too near to be able to avoid a battle. The army I is composed of 78 battalions and 90 squadrons: these two armies are nearly of equal strength.

The left of the army A hath a fine plain before it, extending from the morass to that part where the height commences. In that place are posted eight battalions in two columns of four battalions each, next the morass, with 10 pieces of cannon between the two columns: there are 14 battalions in the first line, and 13 in the second; four battalions towards the height, and next the cavalry. Sixteen battalions occupy the height as far as the small wood; four battalions occupy the other side of the wood, and 32 battalions upon two lines very close together; 12 battalions behind the height next the rivulet; 12 squadrons of horse, and 20 of hussars, who have orders to pass three bridges thrown over the rivulet, and attack the town with three columns of four battalions each, sustained by the 12 squadrons of horse, and the 20 of dragoons. In the rear of the cavalry upon the left, are posted 16 squadrons of dragoons at a little distance, with intervals; so that, if the enemy should attack this left and beat it, the cavalry may easily retire through the intervals of the dragoons, to give them the greater facility of acting, and turn their defeat into an

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an almost certain victory. Fifteen squadrons of horse are posted behind the height, with their right toward the height, and their left toward the camp, in order to take the enemy in flank, whilst he is employed in pursuing the cavalry of the left, which he has beaten. The chief object of the attack should be the town, although the most difficult. If it is forced, the enemy will be beat without resource: because the infantry who has driven him from that post, will attack him in the rear; at the same time that the infantry which remained on the height will come down from it, and join, either to attack, or at least to employ the enemy upon the height, and by that attack prevent him from sending assistance to the troops already driven from the town and put to flight: the cavalry upon the left will advance at the same time to support the infantry, and, if necessary, to charge the enemy's cavalry.

The 32 battalions which are upon the height in two lines, will be divided into six columns, of which four of six battalions will be employed in attacking the town, the last battalion of every column excepted; which must remain at the entrance of the wood, with four columns of four battalions upon the left, in order to sustain the infantry attacking the town, and to keep back the enemy's cavalry upon the left. They will descend from the height under the protection of the wood by which it is covered, and which ends at about 400 toises from the town. These troops will be followed by artillery, which must be posted between the columns; they must halt on leaving the wood, and will begin by making a continual fire of cannon upon the town and the cavalry: during this fire of the artillery, the 12 battalions on the other side of the rivulet ought to attack the four battalions and the eight squadrons of dragoons belonging to the enemy; and when they have forced them to give way, they will amuse them by a constant fire of musquetry. When the artillery shall have played long enough to have broken down the enemy's entrenchments, and destroyed the order of the troops, the four columns, formed of 20 battalions, will march up, and with their bayonets endeavour to penetrate at some part; the 12 battalions on the other side of the rivulet will charge at the same time; the two columns of four battalions each, as well as the four last battalions belonging to the columns which attack the town, will remain at the entrance of the wood with the artillery, in order to keep back the enemy's infantry and cavalry which was next the town. If any one of the columns can penetrate as far as the bridge that is in the town, it will take possession of it, as well as of the market-place; the others following it will take possession of the hedges and gardens. One column only will be sufficient to secure the banks of the rivulet, and take possession of the bridges. As soon as the bridges are free from the enemy, the 12 squadrons of horse and the 20 of hussars will pass and attack every thing they find to oppose them; then the left ought to advance: the battalions which have remained upon the heights should come down from them, and all together attack the front of the army, whose left wing is already broken and taken in flank.

But if the enemy, after having examined the disposition of the army A, imagining that the principal attack will be directed against the town, instead of remaining in his first disposition, changes it entirely, and causes a part of his second line of infantry to march to the town; and if he strengthens his right by the cavalry of the left (a spot more favourable for cavalry than infantry), the attack of the town will then become impracticable, because of the great superiority of the troops defending it; therefore it would be useless to persist in it; but his right should be vigorously and briskly attacked. It is true, that it is reinforced by the cavalry from the left; but as the ground between the height

and the eight battalions which are next the morafs can contain but 12 squadrons, those which the enemy hath drawn from the left can only be posted behind the height, or in the third line; if they are behind the height, nothing can prevent their being attacked: but supposing the first line broken, it should not be too warmly pursued, for fear of separating, and being taken in flank by the cavalry behind the height. The 16 squadrons of dragoons which are behind, ought to remain in that situation; the 15 squadrons of horse, which are with their right to the height, and their left to the old camp, ought to take the place of those who have attacked the enemy; and then the 20 battalions which are upon the height will come down into the plain and attack the enemy's infantry, at the same time that the 15 squadrons of cavalry and the 16 of dragoons attack the cavalry which is posted behind the height. If they succeed in beating it, or whether they do or not, if the enemy sends assistance, he will weaken his left, and then the 44 battalions, who till this time have remained inactive, may come down from the height and attack the town, not so much with a design of forcing it, as to oblige the enemy not to take any troops from it; if no assistance is sent to the right wing, it will be undoubtedly beaten, being attacked by forces so greatly superior to it: the whole of the cavalry being thus put to flight, the most prudent part the enemy can take is, to endeavour to pass the rivulet by the three bridges behind the town, and by so doing secure himself from farther insult: if the enemy does this, the 12 battalions, the 12 squadrons of horse, and the 20 of dragoons, will retire by the same road they marched up, and they will be in security as soon as they are in the wood: besides, a beaten army is seldom to be feared; therefore, they may retire unmolested, and in order.

But if it happens that the enemy, without changing his position, is not to be forced in any of these attacks, the general had better retire to the height, where there will be no danger of the enemy's endeavouring to attack him: but if he should attempt the attack of the left wing of the army A, it must be reinforced by all the cavalry that can be employed without causing confusion, and two brigades of infantry should be joined to the two which are next the morafs.

DISP. IV. The fourth disposition is supposed in a country mixed with thickets and plains. The enemy's army hath its right to some mountains, and its left to a river; in about a third part of the length of his front, there is a village a little behind its right. His disposition is, four battalions and six pieces of cannon upon an height which overlooks the plain, to which is also added the cavalry of the right. Behind are two passes entrenched and guarded by four battalions; upon the heights of these passes there are four more, to prevent the enemy penetrating at the flank. There are eight squadrons in the first line, four battalions posted at the village, and 12 in it with cannon: 16 battalions on the left of the village, 14 squadrons and four battalions next the river. The second line consists of 11 squadrons upon the right, eight battalions behind the village, in order to carry timely assistance to it; 12 battalions in the rear of the 16 of the first line; 15 squadrons and four battalions to the river. The reserve consists of 18 squadrons of dragoons next the mountains (in order to dismount and be within reach of assisting the battalions guarding the passes), and of 24 squadrons of hussars on the left next the river. An island is supposed a little in the front of the first line: in this island are placed two battalions and six pieces of cannon. A stone bridge is also supposed between the two lines, behind which is posted two battalions, to support those in the island, and to facilitate their retreat. It seems impossible to attack an army thus situated;

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situated; all the troops are a mutual support to each other: the flanks are secured and well guarded; artillery is planted along the whole front; and the passes are entrenched, and troops posted in them.

In the front of the enemy's army is a large plain, which runs from the mountains as far as the river; but the largeness of it is broke into by some thickets, where nevertheless cavalry may act: in order to attack this army, thus advantageously posted, a disposition must be made, entirely different from that which it is in. If the village, which is entrenched and well furnished with troops and artillery, is attacked, the forcing it will be doubtful: but supposing it should be forced, it will not be without losing a great number of men; which should be avoided, because it is the duty of a general to spare the blood of his soldiers as much as possible, and even, if practicable, to employ but few of his troops against a greater number of the enemy's. If the passes only are attacked in order to take the enemy in flank, it is very certain he can send assistance to it without weakening his front, having it in his power to cause the eight battalions in reserve behind the village to march there, and to cause the 18 squadrons of dragoons to dismount. If only the left wing next the river is attacked, it is true that attack is more practicable, there being no obstacle or entrenchment to prevent coming up with the enemy: but still there is but one wing beaten; and that, by falling back upon the troops in the village, can retreat by the mountains of which the enemy is master. There is great reason to imagine it will be beat; but the general must endeavour to reap as much profit from that victory as he can: it is therefore thought that, not to lose the fruit of it, the enemy should be attacked on the left wing, from the centre to within about 200 toises of the river, at the same time that the entrenched passes are attacked. During these two attacks, a brisk cannonade should be kept up upon the village, the infantry and cavalry upon the right, the infantry that is posted in the island, and that which is next the river: by these two attacks the enemy's front and right wing will be equally annoyed; he will not know where to send assistance, and in that state of uncertainty may probably send it to a part where the danger is not so pressing. But suppose he should act in the most proper and prudent manner, as it should always be imagined he will, the assistance which he will send to that part, cannot be effected without unfurnishing or weakening some other: if he strengthens the passes and the heights with the eight battalions behind the village, they perhaps will not be forced; but he will scarcely venture to take any troops from the village, in order to send them to the assistance of the front that is attacked. But if he should unfurnish the village, it must then be attacked, and that vigorously; which may be the easier done, as it hath been for some time cannonaded, and consequently the earth hath been tumbled down, and openings made, at least large enough for the infantry to enter it: this attack will not at all prevent that at the front from going on.

In order to execute the attack upon the enemy's army, it is imagined the troops ought to be distributed after the following manner: all the infantry should be placed in the first line, excepting that of the reserve, which should consist of 20 battalions; the second line should consist of the cavalry; and the third should be formed of the dragoons and hussars. The 20 battalions on the left, forming five brigades, should remain in order of battle at the coming out of the thickets, with artillery distributed between the intervals of each brigade; the 28 battalions, after making seven brigades as soon as they come out of the thickets, will form in column: then the 24 squadrons which are in the rear of the infantry, formed in column, will post themselves, four squadrons in

the intervals of each brigade. The brigade supporting the right flank will advance on the side of the river: and then the seven columns and the 24 squadrons will march up to the enemy and attack him with their bayonets, without losing time in firing. As soon as the columns have broken or staggered the enemy's first line, the cavalry will fall furiously upon them, sword in hand; a part of the dragoons and hussars should follow, in order to be within distance of sustaining the troops who have attacked, or to join themselves to the cavalry who have broken in among the enemy: it should be observed, that as soon as the hussars are engaged and pursuing the enemy, the cavalry should rally in order to sustain them, or to flank the infantry which may still make resistance. The brigade of infantry which supported the right, followed by the seven squadrons, should attack the four battalions on the left of the first line, and the seven squadrons will take them in flank; which they can with the greater ease effect, as the cavalry hath been put to flight. The seventh column should, with four squadrons, attack the four battalions of the second line, at the same time that this attack is executed from the front as far as the river; 16 battalions of the 20 in reserve should attack the passes, and also the heights; the remaining four will march under cover of the mountains, sustained by a brigade of infantry and eight squadrons, in order to attack the cavalry on the right; thus of the whole front of the enemy's army, there will remain only the village that hath not been attacked, unless there hath been such a number of troops drawn from it, as to render the carrying of it not difficult. It is to be supposed that one of these attacks will succeed; that made by the columns sooner than the rest: the disposition of columns intermixed with cavalry is very formidable, because each body is supported without confusion: besides, it is to be supposed that a column four battalions in depth, and from 18 to 20 men in front, ought to break through a line that is only four deep, and which being once penetrated, the cavalry will find no difficulty in breaking through it. See Plate DXXIII.

The movement of the infantry to form itself in column, and the evolutions of the cavalry to fill up the intervals of each column, ought to be performed with great quickness, and near enough to the enemy to surprise him, but not at such a distance as to give him time to remedy it.

The nature of the ground, which is continually changing, cannot be followed through all its various shapes; the author from whose work we take this article hath therefore endeavoured to form his dispositions in those situations which most ordinarily occur, in order that these general dispositions may be assistant to the ideas in more particular and critical situations. Mountainous countries have not been mentioned, because it is very rare that they present an opportunity of coming to a general action: the affairs which happen among them are generally with regard to some post, which can never decide the fate of an army, however brisk they may be. The four dispositions now mentioned are ideal; and although the propriety of them may be defended, it would be very imprudent to answer for their success; because with regard to the business of war, the whole depends upon circumstances, and the least accident often renders a disposition, seemingly the best, the most prejudicial that can be taken. A motion of the enemy's troops ill conducted by their commanders, too much sloth or too much eagerness in the execution of orders, an accidental word falling from the mouth either of an officer or a soldier, and which is always increased when told again, may occasion the defeat of an army, however well disposed or advantageously situated. The epithet "best" should be given to that general who commits the fewest faults; for there

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there is no man who can flatter himself with having committed none : it is impossible for a general to see every thing himself, or to remedy any unforeseen accident that may happen, if he is not assisted by his general officers, who see things which it is impossible he can : they ought not only

to be the means of putting his orders in execution ; but even, in certain circumstances, they should prevent them, and make the same dispositions which the general ought to make, and would certainly order, were he in their situation.

PART III. Of the PETITE GUERRE.

THE Petite Guerre consists in the manœuvres of the Partisan in secret marches, occupying, defending, or attacking posts, reconnoitring countries or the enemy, placing of ambuscades, &c.

SECT. I. *Of the Qualifications of a Partisan, and the Nature of his Corps.*

THEY generally call every officer a partisan who is destined to go at the head of a detachment, whether draughted from the body of the army, or of a party which he belongs to, and for that reason has no other name than that of a partisan.

Of all military employments, there is none which require more extraordinary qualities than that of the partisan. A good partisan ought to have an imagination fertile in projects, schemes, and resources ; a penetrating spirit, capable of combining the whole circumstances of an action ; a heart intrepid against every appearance of danger ; a steady countenance, always assured, and which no signs of disquiet can alter ; a happy memory, that can call every one by his name ; a disposition alert, to carry him through every thing, and give a soul to the whole ; a piercing rapid eye, which instantly catches faults or advantages, obstacles and dangers of situation, of country, and every object as it passes ; his sentiments ought to be such, as to fix the respect, confidence, and attachment of the whole corps. Without these dispositions, it is impossible to succeed.

A partisan ought to spare nothing to be assured by his spies of the march, force, designs, and position of the enemy. As chief, he owes the example of an irreproachable conduct to his corps, by which he will inspire respect, love, zeal, and vigilance, and gain the hearts of the whole to his service. It is extremely dangerous for such an officer to contract the least attachment to women, wine, or riches. The first makes him neglect his duty, and frequently occasions the most ruinous treacheries : the second leads to dangerous indiscretions, and is sure to draw down contempt : the third leads to guilt, and destroys all sentiments of honour. The partisan must be content without the delicacies of the table, as he may be often exposed to want provision ; his bed the same with the mens, a cloak and straw, never stripping but to change linen. Nothing animates soldiers so much as the presence and vigilance of a commanding officer sharing with them the fatigues of the service : the officers follow his example ; the men are assured, encouraged, and content.

A corps capable of carrying on the Petite Guerre to advantage should be composed of infantry and cavalry ; and as it is incontestable that the cavalry ought to be the most active in carrying on the Petite Guerre, it were to be wished that they were likewise the strongest, so as to have 600 cavalry and 400 infantry in a corps of 1000 men, making four companies of infantry and 12 troops of cavalry.

The commanding officer should have the naming of the officers of this corps, or at least have liberty to reject such as he is convinced are not qualified for such service, as every officer who may be ambitious to serve in the corps, tho'

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possessed of great military merit, may not have the talents requisite for the duties of the partisan.

To support the honour of this corps upon a solid and respectable footing, the strictest subordination must extend from the chief to all the officers, and the most rigid discipline inspire vigilance, patience, bravery, and love of glory, to the whole corps.

It is of the utmost importance for the officer that commands, to have the choosing his men and officers whom he knows to be fittest for his enterprise, and thereby preventing many difficulties, contradictions, and dangers, which jealousy and distrust always occasion among strangers.

No recruit for the corps of a partisan, either cavalry or infantry, should exceed 30 years of age ; but the younger they are, if they can carry arms, so much the better for such a service, to which youth is particularly inclined. In the choice of recruits for the cavalry, it were not unworthy the attention of officers to prefer men that are lovers of horses, and to recruit chiefly in those countries where such are mostly to be expected.

As for arms, the firelock and bayonet is sufficient for a foot soldier ; and in the corps of the partisan, barrels of 36 inches, with a long bayonet, but to have the caliber the same as that of the rest of the army, which, for the sake of having ammunition made up to suit the whole, ought to be invariably the same. A helmet likewise is preferable to a hat, as the sword is almost the only thing to be dreaded from the enemy's cavalry. Four spades and four pick-axes should be given to each company of infantry.

The present manner of equipping the light dragoons is so perfect, it is unnecessary to say any thing on that head ; but no white horse, stone horse, or mare, should be suffered in the corps of the partisan, as the least neighing or perceivable colour may make enterprises fail. No horse should be mounted for service till six years old. The size of the light dragoons is very proper for the partisan ; and while they have firm ground to act upon, and plenty of forage, none can excel them ; but when they come among morasses, and feel the severity of want, perhaps the Hungarian hussars may be found more equal to the duty : possibly, therefore, in forming the corps of the partisan, 200 horse, such as are bred in the mountains of Wales or Scotland, mounted by the lightest men, might be found of good service.

The principal attention of an officer of cavalry should be, to see that the men feed and dress their horses well. During the whole campaign they should have dry food only, as green weakens them. When the exigency of the service requires the horses to be kept saddled day and night, every horseman should seize some moment to turn the saddle-cloth, which greatly comforts a horse, keeps him at ease, and less apt to gall ; and care should be taken to keep the cloth soft, and clean from sweat and dust.

SECT. II. *Of Posts, &c. and the different Works with which they may be fortified.*

POSTS are generally such places as bodies of troops can fix in when detached from the army, to cover and secure the frontiers ; and upon the vigilance and resistance of the parties

parties that are detached there, depends the safety of the army. Whatever the abilities of a general may be, it is scarce possible that he can have an eye to every detail that contributes to their defence; it is sufficient if he knows that the guards are properly placed, and the line that they make properly established. It is then the business of the particular officers who command them, to make the best disposition for a vigorous defence, and answering the views of the general.

An officer who is detached to a post, is either to relieve a party, or take possession for the first time. In the first case, if the guard which he relieves happens to be entrenched, as soon as he arrives at the post, and has taken his instructions from the officer who commands, he should prepare himself for his defence, as shall be mentioned in that article. In the second, if an officer who is detached is to entrench himself, he must examine if the place is advantageous for the execution of his projects, the defence of his people, and the securing a retreat.

He must consult, 1st, Whether the situation be convenient for sending parties to discover the enemy; whether to give intelligence of their situation and march, or to disturb and surprise them. 2d, If it has some natural defence on its front or flanks, such as a river, rivulet, morass, or small wood that can be easily penetrated. 3d, If he can preserve his communication with the army, and if there are some covered places to favour his retreat. 4th, If he can discover all the approaches; because if the enemy can come within a small distance of the post without being seen, he will place himself under cover there, and rest while the besieged are obliged to remain continually under arms, and will watch the moment for making an attack. If then he finds hollow roads, clumps of wood, or any place where the enemy can secure himself in the neighbourhood of his post, he must fill them up, or guard them with detachments of six or seven men. 5th, He must take care not to be commanded by any neighbouring heights, or must prevent the enemy from profiting by that advantage; because if they can take his soldiers in the rear, it will be impossible for them to defend themselves. 6th, The extent of the work must be proportioned to the number of men that are to defend it. Good sense and numberless examples prove, that too large entrenchments can only be defended by considerable bodies. 7th, He should take care to have all the parts of his entrenchment nearly of an equal strength, so as to be able to make an equal resistance everywhere; and, lastly, He will take care to fulfil exactly the intention of the general in posting a guard in that place.

There are some places so advantageously posted by nature, that though they are not fortified, they may in a short time, and with little charge, be made so strong, that it will require as much art to besiege them as many others that are perfect fortifications; such as islands, peninsulas, and places seated on eminences of difficult access, or in morasses.

If the post is in a level country, or upon a height that may be surrounded, as happens almost always to small detachments, they should construct a redoubt, or small square fort, composed of a parapet with its banquette and ditch.

The ground being chosen, you must trace a straight line AE (fig. 1.), and raise the perpendicular BC, as directed in practical geometry; observing to give to each of these lines which mark the interior side of the parapet but two toises, or two and a half for 30 men, four toises for 50, and eight for 100; which will leave a space of two feet at least against the parapet for each man. Having traced the two first lines A, B, you must put the cord over the picquet C of the perpendicular B, and with the same length trace the

arch D, then put the cord over the picquet E of the line A, and trace the arch E. The point where the arches intersect each other, is the point to end the lines EH and CG. These four lines mark the interior side of the parapet.

Then trace four other lines at the distance of two or three feet parallel to the first, as I, L, M, N, to mark the size of the banquette, which should be greater or less according to the number of soldiers you would place in a file. Then trace a third parallel square on the outside of the first, as O, P, Q, R, to mark the exterior side of the parapet, and to determine its thickness, which is usually eight or nine feet, or 18 if it is to resist cannon, which you should always be prepared to do.

Then trace a fourth and last square STVX, to determine the width of the ditch, which is the same or two feet more than the thickness of the parapet; leaving a picquet planted at all the angles, as likewise at the lines already traced, so as not to lose the points from whence the lines were drawn.

While you are employed with two or three men in tracing, five or six men should be ordered to cut down the trees that are in the neighbourhood of the post, not only to open the approaches, but to serve for constructing the intrenchments. The smallest branches serve to make fascines, which are a sort of faggots about six feet long, two feet thick, and of the same size all over, tied in the middle and at the two ends, to serve for supporting the earth, which would tumble down without that support. The middling branches serve to make picquets proper for mixing with the fascines, and fixing them in the ground, or one above another to raise the parapet. The trunks to which the large branches are left, serve to increase the strength of a post, as shall be mentioned afterwards.

Having traced all in the manner directed, fix a row of fascines upon the small square ILMN, to support the earth of the banquette; then fix a second row upon the square ABGH, to support the interior side of the parapet; then a third row on the third square OPQR, to support the exterior side of the parapet. You should observe in the beginning to picquet the fascines, to leave a passage of three feet PB, on the side least exposed to the enemy, to serve for an entry to the redoubt; but if this passage can be taken in a straight line, it should be made like a mortoise, as you see at Y, fig. 2.

After having picqueted the three rows of fascines as directed, you must dig the ditch AB, as in the profile, fig. 3. a foot distant from the exterior side of the parapet. This distance or breadth is called *berme*, and serves to support the earth, or receive what falls from the parapet by the enemy's cannon. This *berme* is more or less according to the solidity of the earth; the earth to be thrown into the intervals C, D, E, marked for the parapet and banquette, taking care to make the men tread it well down, and observing to leave a *talus* or slope on the two sides of the ditch FG, more or less according to the consistence of the earth, so that it may not tumble down. The slope F, which is on the side of the redoubt, is called the *scarp*; and the opposite slope, which is next the country, is called the *counterscarp*. Care must be taken in picqueting the fascines with which the parapet is raised, to bring them nearer one another by degrees in raising it as at H, so as to leave the same slope on each side. The distance DE marks the banquette; the distance DC the thickness of the parapet at the bottom; the distance IL the thickness of the parapet at the top; MN the width of the ditch at bottom; AB the width of the ditch at top.

If the ground is level, the banquette of this work must be

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be raised two feet; but in low places two banquettes are necessary, the one above the other like steps: but if this banquette is raised on account of some neighbouring heights from whence you may be taken in the rear, the parapet must be raised to such a height, that the enemy's shot can no longer plunge down upon you. A slope must be left on the top of the parapet, as IL, so that the soldiers may see round the post, and fire easily towards the country at O.

Though the square form of a redoubt, which we have given the method of constructing, is almost the only one used in the field, yet it has its faults, which ought to make it be rejected, at least for those posts which ought to defend the environs equally. Experience shows us, that we ought never to depend on the oblique firing of musquetry, as the soldiers almost always fire right forwards, as at A, fig. 4. and often even without taking aim. This being the case, there are large spaces opposite to the angles of the redoubt at B that are not defended, and where we may say that the enemy remains in safety. The chevalier Clairac proposes an excellent method to prevent this inconvenience, by constructing the interior edge of the parapet like the edge of a saw, in form of small redans, to hold a man or two in each side, fig. 6. which by the cross fire takes the enemy on the two flanks, so that there are no approaches but what are defended; but the construction of this redoubt is too tedious and complex to be executed by small detachments.

The same author prefers constructing circular redoubts as at C, fig. 5. because all the points of the circumference being equally disposed, the soldier posts himself indifferently over all; and the exterior spaces D which are defended, varying every moment, the enemy is nowhere in safety.

The circular redoubt, then, is the most perfect that can be constructed: but where a road or the edge of a river, is to be defended, the square, or long, or triangular redoubt, is preferable, because they ought to oppose the faces of the intrenchment as parallel as possible to the places they are to fire at, observing always to round the angles.

To trace a circular redoubt, after fixing the central point of the post, let a picquet be fixed in that point, and draw from it as centre the circle EE, with a length of cord in proportion to the number of the party, to mark the interior side of the parapet; then trace another within the first, at the distance already given, to mark the banquette; then trace a third FF, to mark the exterior edge of the parapet; then trace a fourth GG, to mark the width of the ditch; which being done, picquet the fascines, and make them take the bend of the circle, finishing as in a square redoubt.

If an officer is posted with a detachment on a passage or before a bridge, in a defile, or opposite to a ford, he may make a parapet either bending or straight, with a banquette or ditch which should shut up the whole entry; or he may make a redan, which is a work with two faces, and in such a situation should be made with a re-entrant angle (that is, the angle pointing from the enemy); taking care when he is to guard a ford, to construct it so near the river that the enemy cannot have room to form after they have passed. A deep ditch may be dug opposite to the ford, into which they should let the water of the river pass; they may likewise make the banks steep; throw trees across, and scatter chauffer-traps, which are instruments of iron with four spikes, made so as to have always one point erect.

The strength of a redoubt or any other work may be augmented by blocking up the passage that leads to it, surrounding the post with felled trees, and sinking their trunks three or four feet deep in the earth, which must be dug on purpose, leaving a number of large branches on them, which

must be sharpened at the ends, and the leaves taken away, and placed as near to one another as possible, so that the branches may mix, and taking care that they incline towards the enemy. Two or three rows may be made in this manner; but they should be at least two toises distant from each other, that the enemy may not burn them all at once to approach the entrenchments. M. Saxe in his *Reverie* says, that redoubts are proportionably advantageous as they take less time in constructing, and are proper for numberless circumstances, where one often may serve to stop an army in a close country, hinder them from troubling you on a critical march, or to occupy a large space of country when you have but few troops.

There is no need to mention large works which require engineers to construct, and great bodies to defend them, as these have been described under the article *FORTIFICATION*; but a redoubt, such as A, fig. 7. may be strengthened by filling the ditch with water, by turning a rivulet, or cutting a river or pond. If the ground is uneven, so that the water cannot be put equally in all parts of the ditch, dams should be left in digging at C; or little traverses of earth to form banks proper for keeping the water in the upper part of the ditch D, from whence it may be let run into the lower E. These banks should have but half a foot in thickness at the height D, which should be raised sharp; but a good deal more must be left below at E, by sloping the two sides pretty much. Dams likewise are made of planks or boards, as at F; but they must be strong, and supported by large stakes, so that the body of water above may not overturn them; and then they are reckoned preferable to those that are of earth: but a more particular explanation of this figure may be of use.—A therefore is the ground within the redoubt. B, The bottom of the ditch. C, D, E, Dam of earth. F, Dam of planks, boards, or fascines. G, Upper part of the redoubt constructed of fascines, and the earth dug out of the ditch. H, The lower part of the redoubt dug in the earth. I, The berme or space left at the bottom of the parapet to support the earth. L, The entry of the redoubt. M, The inside of the parapet. N, The upper part of the parapet. O, The banquette. P, The glacis. Q, Rivulet from whence water may be let into the ditch of the redoubt.

BUT it is not with the works alone which have been already mentioned that an officer may fortify a post; there are an infinity of ways to stop an enemy, to tire him, and even to repulse him, with which it is necessary that every commander should be acquainted.

All the schemes for opposing the enemy, of which we have given a detail, serve only to add to the exterior strength of posts; there are others which have some natural fortifications, such as churches, church-yards, mills, or farm-houses, &c. An officer who is sent to a post of this kind, which is detached from other buildings, ought, before he begins to work, to make the inhabitants go out, and the magistrates of the nearest place receive and lodge them. He should then entrench the house with a turning parapet, if he have people enough to defend it; but if he have only a few, he should make a breast-work of felled trees round the house, especially opposite to the angles, to prevent the enemy from undermining it. He must likewise take off the tiles and slates, lest the enemy should get up by ladders, and crush his people that are within. If the house is covered with thatch, it should be pulled off and burnt, as well as every thing combustible that can be found in the neighbourhood, lest the enemy make use of it against the house.

Though the house is surrounded with a parapet of felled trees, yet the walls should yet be pierced with loop-holes,

about a foot from the ground, so as to discover the enemy's legs, that they may not get footing on the outside. These loop-holes should be four inches wide, and three feet distant from one another; and a little ditch should be made a foot and a half from the wall within the house, to place the soldiers in who are to defend it. Other loop-holes should likewise be pierced seven or eight feet from the ground, opposite to the interstices of the lower ones, and of the same width, placing the soldiers that are to defend them upon tables, planks, or ladders; and taking care to pierce a greater number opposite to the avenues, before, and at the sides of the gate, and the angles of the house, because these are the places where the enemy usually makes his greatest efforts. If the house has an inner court, the walls should be pierced which inclose it, so as to fire upon the enemy after he has made himself master of it. If there are several gates, they should all be blocked up except one, to be left for an entrance to the post, which should be made so as to admit but one man at a time.

If there is a broad staircase for going up to the first floor, it should be broke down, or blocked up with stones or casks filled with earth. If it is a winding stair, the wall should be pierced in different places with loop-holes, to fire upon the enemy that are already entered, keeping ladders for the troops defending the house to get up to the first floor, which should have the boards pierced with a number of holes about four inches diameter, to fire down upon the enemy, observing to pierce them only where there are no trees below, but to have a greater number over the door and other weak places which the enemy can force. A post entrenched in this manner may resist a great while, and even fire out the besiegers if defended by resolute men.

Captain d'Enfernay of a French regiment, with a company of volunteers, in the campaign of 1748, took post in the church of Bevera, two miles from Ventimiglia. It is detached from other buildings, and he fortified it with a parapet and ditch full of water; but his entrenchment was commanded by some houses in the village, so that the enemy could fire down upon his party. He remedied this defect by covering the commanded part with a kind of blind made with rafters, leaning with one end on the wall of the church, and the other upon posts raised a foot higher than the top of the parapet, which left room to fire through. This blind, covered with fascines and earth, prevented the enemy's fire from piercing, and did not prevent his firing upon them, so that they durst not attack him.

This example is mentioned to show how to secure a post that is commanded by a height. When there is no redoubt or entrenchments of earth, the interior side of the parapet which is commanded should be raised, or a sort of penthouse should be made with rafters, placed perpendicularly against the inner side of the parapet, upon which planks or fascines are nailed, taking care to leave room between the bottom of the penthouse and the top of the parapet for the men to fire through.

If an officer has not time to oppose all the schemes which have been mentioned to the enemy, when the general wants to make a forage, and throws infantry into the house to form a line, he should immediately place a couple of trees across before the door, pierce the boards, shut the windows, and prepare for his defence, which gives time to the foragers to retire, and the supporting parties to advance.

The fortification of villages, if they consist of scattered houses, differs nothing from the fortification of a few contiguous posts, between which a communication is to be preserved. If they consist of houses collected, the commander must proceed upon the principles laid down in another article. See FORTIFICATION.

SECT. III. Of going on Detachments and Secret Marches.

DETACHMENTS are particular bodies of soldiers detached from a greater body, to guard a post, or to go on an expedition.

When an officer is ordered on a detachment, he should provide himself with a cord regularly divided, in case he has occasion to entrench; and be at the parade by times, to get information from the brigade-major, whether he is destined to relieve a detachment, or to occupy a post for the first time. If to relieve a party, he is only to know where the guide is who is to conduct him; the guide is a soldier, sent by the officer who is to be relieved, as orderly-man to the major-general, who by having been at the post before can lead a new detachment to it.

If it is a post that is to be occupied for the first time, the officer is to ask the brigade-major for instructions relating to its defence; which being got, he must inspect his party, and take care that every soldier is properly equipped; his firelock loaded, fresh primed, and a good flint well fixed; his cartouch-box filled with cartridges; and that he carries provision for 24 hours, which is the time that detachments commonly continue, and are not allowed to go away to eat. Care must be taken to have spades, pick-axes, hatchets, and wood-bills, one or two of each kind; and if any thing is wanting, to apply to the brigade-major for it, that they may have every thing necessary for entrenching.

When an officer has inspected his party, he ought to get information from his guide whether the way is broad or narrow, open or inclosed; if the enemy's posts are near; if they go on patrols, or see their parties in the day; and, lastly, if he is to pass mills, farms, manors, &c. and from these informations take the necessary precautions for his march.

When the whole are ready to march, the advanced guard A (fig. 8.), which should consist of cavalry only, should set out. It is surprising that all the authors who have written on this part of the art of war, have neglected to show sufficient attention to so essential a point: the greatest part are silent, and the rest passing slightly over the different duties of this corps, are content that it should be composed of infantry; though, on the least reflection, in the most ordinary cases of a secret march, reason must determine that none but cavalry ought to be placed there, whether it be to stop passengers who may discover your route, or suddenly to attack an advanced guard of the enemy whom they meet face to face, or to harass their corps, in order to gain time for your own to form: it is incontestable, that for all these purposes, cavalry has greatly the advantage of infantry; who are by no means capable of running here and there to seize passengers, or of pouring suddenly on an advanced guard of the enemy; or of resisting their cavalry a moment in case of a sudden rencounter, when they must expect to be thrown down and trod under the horses feet, and the corps attacked before the commanding officer has had a moment to prepare for his defence.

As examples serve best to illustrate opinions that have been seldom declared, the spirited behaviour of Comet Nangle of the 15th regiment of light dragoons merits our particular notice, and will serve as a proof of the great advantage of having the advanced guard of cavalry. In the campaign of 1761, when the French army under the command of Marshal Broglie and the prince of Soubise were retreating towards Hoxter, where they passed the Weisser, Prince Ferdinand followed close after them for several days, and

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and on the evening before they gained the pass over the river, one of Prince Ferdinand's German aid-de-camps desired the grenadiers and Highlanders who were in front, to push on and take some of the enemy's baggage, which was a little way before them and but weakly guarded. They were immediately formed, and marched in a hurry over a plain with a thick wood in front, which they were told was clear, and had got within 400 paces of the enemy's baggage, when several squadrons of French dragoons rushed suddenly out upon them from the skirts of the wood upon both flanks, and were hewing them down without mercy, when Cornet Nangle with an advanced guard of 20 men coming up the hill, got sight of the attack, and instantly rushing on, charged the French cavalry, who, startled at the briskness of an attack which they were not expecting, immediately reined back; when the rest of the regiment getting in view, came on; and attacking the French, drove them off, having killed and wounded a few, and taken some prisoners. The determined bravery of this young officer with his 20 men saved a great number of the grenadiers and Highlanders from being cut to pieces, and shows what may be effected by the sudden attack of an advanced guard of cavalry.

An advanced guard by night should be of double the force of one by day. In an open country, it is a matter of indifference at what distance they advance, provided they keep in view of the commanding officer, who should continually observe them: but in covered places, and in the darkness of the night, they should not be more than 50 paces distant.

This advanced guard should have an advanced corporal B, with six horsemen divided into three pairs; one in the centre B, the two others out of the road on the right and left at CC, to examine as wide as possible, silently and attentively searching all hollow and covered places, taking care that there is nobody lying on the ground, or hid in dry ditches, behind trees or bushes. At the same distance of 50 paces upon the flanks of the corps, should march two wings DD, consisting of eight or twelve horsemen, each according to the strength of the corps, led by a non-commissioned officer. They can harass an enemy who may happen to rush suddenly out of ambuscade, and give time to the corps to form. Each wing to detach two men EE, keeping 50 paces wide from the others, and preserving the same route as exactly as the face of the country will permit. At the entrance of the wood NN, the horsemen should spread, and close again at coming out, and do the same at meeting any little hills, to examine them on both sides. When they perceive any traces of a party, they should immediately communicate it from one to another, till it comes to the commanding officer.

The advanced guard ought to march slowly, and the commanding officer at the head of the corps should follow at the same rate, so that the rear of the detachment may not be obliged to gallop. As the rear-guard H is only established for form, there is no need of its being numerous. The officers and quarter-masters should be careful to keep the men from sleeping, as a horse is easily hurt under the irregular motions of a sleeping rider, which retards the march. The whole corps should be forbid to smoke or speak; and if any one is obliged to cough or spit, let him cover his mouth so as to make no noise.

When the corps is numerous, the cavalry should march by squadrons, the infantry by platoons, to follow alternately, so that each platoon of infantry FFF may march at the head of a squadron of cavalry GGG; which disposition will preserve the whole at an equal pace, and keep them readier

to form in case of meeting the enemy, or being suddenly attacked, as we are about to mention.

When the advanced guard perceives an enemy at a distance, whether it is day or night, they should not pursue them, for fear of falling stupidly into some ambuscade, if it is not in a country that has been well examined; but if they meet them suddenly face to face, as may happen at the entrance of a hollow way I, opening obliquely upon them, then the advanced guard, without deliberating about their strength, should instantly rush upon them. This manoeuvre cannot fail against infantry, and gives a great advantage in a rencounter with the cavalry; but if the advanced guard falls back, they expose the whole body to be defeated with them.

When the commanding officer sees the action of his advanced guard, he will instantly turn the infantry on the side of the road most proper to protect them from the enemy's cavalry, and will form them quickly at the side LLL, or on some neighbouring height MM. If it is day, they ought to face the cavalry, stooping down till the instant of the attack, while the first squadron advances to sustain the advanced guard. If the enemy appears desirous to renew the charge, and obstinate in disputing the passage, he may make use of a feint, and by falling back bring them opposite to his infantry, who will have them in the flank, and by a well-placed fire put them instantly in disorder. His cavalry profiting by this, must immediately face about, and fall upon them with all possible violence; which cannot fail to complete their defeat.

All villages, hamlets, and houses, should be avoided, especially by night (which is the most common time for the partisan), to avoid being discovered by the barking of dogs, or being seen by peasants who can inform the enemy. You will see equally how dangerous it is to keep the great roads by day, or to cross places that are too open in an enemy's country.

If you cannot avoid passing through a village, it should be done in a hurry, marching confusedly, very close, and filling up the whole breadth, by which you will conceal your strength from the peasants; some officers should remain at coming in, and in the rear, till the whole are passed, taking care that no one stops or withdraws. The same care should be taken at every road that opens upon your route. At the approach of every place that is covered or hollow, such as house, wood, gully, &c. they should halt till it is well examined, and continue attentive in passing it.

At the passage of defiles, bridges, or fords, the advanced guard should stop at 100 paces, and form till the whole corps is passed and in order. The ancients employed dogs to discover the enemy in ambuscade; but it will be well to distrust such spies, and to suffer none with the corps, as there is nothing more dangerous; their disposition leading them to bark at meeting the least animal, they will furnish the enemy with a thousand opportunities of observing you, before you can know where they are.

You should always detain the guides that were taken at setting out; but if necessity requires another, the quarter-master should go and take one without making a noise, and lead him a round-about way, that none of the peasants may discover either your party or route. If any of the party discover passengers in sight of the march, they should be stopped and brought to the corps, and care taken to prevent their escape.

The party should never refresh in a village, but in a wood by day, and open country by night, causing every necessary to be brought to them from places in the neighbourhood, which ought to be received from the peasants at a distance,

for

so that they can neither discover the number nor quality of your corps. During the whole time of stopping, you should not be sparing of sentries, and have always six horsemen ready to secure any person by whom you imagine you are perceived; when their number becomes considerable, they should be tied together, and great care taken that none escape till the stroke is struck. The officers should be equally attentive that no soldier gets out of fight; and if they meet a deserter from the enemy, he should be conducted immediately to the corps, and then to the army, under the care of a non-commissioned officer.

When necessity obliges you to stop in the neighbourhood of some farm or hamlet, you must take possession of it, and carry off the farmer or chief of the place at going away, threatening to kill him and set his house on fire if any one stir from the place before he is released. Every horseman should take care to have a spare fore shoe, and a peck of oats.

If an officer of the infantry marches a detachment to relieve a post at a distance, he should not mount his horse till out of sight of the camp, and should dismount on coming in sight of the post; but if it is only about a league distant from the army, and near the enemy, it is better to go on foot, so as to be less encumbered in case of engaging with any parties of the enemy. The men should not be pressed too much for fear of lagging in the rear, but should march close without stopping, and in as many files as the roads will permit, keeping profound silence, that they may hear any orders that are given.

An officer who marches at the head of a party, ought to keep exact order and profound silence, that they may be in a state to execute whatever he may order for their defence; but in giving his orders, he should take care to do it with a firm and determined countenance, so as to make the soldiers think that he is sure of what he is about, and that nothing better can be done. When the men see their officer hesitating, or varying in his orders, they imagine he does not know what to do; and seeing him disordered, they become so. It is upon such occasions that an officer should be steady to restrain his party, and make them instantly obey. The danger is greater on a march than in an attack. Here the soldiers have their arms in their hands; and, seeing the enemy before them, are ready to engage. It is otherwise on a march; they are less upon their guard, and have not their arms in readiness: then, says Vegetius, an attack confounds them, an ambuscade disorders them. An officer ought therefore to take every precaution in examining, by his advanced guard, all places that may conceal any of the enemy.

But as the greatest precaution cannot prevent an officer on a march from being attacked, it is necessary, as soon as he perceives the enemy, to observe if the party is superior to his detachment; whether it consists of cavalry or infantry, or both together. If it is cavalry, and superior, there is no necessity of being discouraged; but, on the contrary, he should profit by every advantage that offers, by gliding into land that is furrowed, uneven, cut, and difficult or inaccessible to cavalry; or if the country is inclosed, he should line the hedges, and cheer up his soldiers by some encouraging language, while he dispatches a trusty fellow with advice of his situation to the general. If the enemy march up to him in this situation, he must do all that he can to sustain the attack, by ordering his party not to press upon one ano-

ther, to keep up their fire, and not to discharge their pieces till they are at the muzzles.

When you have the advantage of rocks or other obstacles to the acting of cavalry, continue the route as near as possible, keeping the party close, and always ready to receive the enemy. If the number of the enemy's cavalry do not exceed your party, you may continue your route; and keeping your men close together and prepared, they will not venture to attack you. If an officer sees no means of possessing an advantageous post, or of getting to the post he was detached to, he can do nothing better than retreat to the camp, along some river or wood, to prevent being broken: but if he is so closely pursued that he cannot avoid being beat or taken, there is no better manoeuvre to imitate than that of the Barbets (A); who scatter themselves, and retire from tree to tree, from rock to rock, and destroy a party, who can neither beat them, nor take one of them.

The moment of taking possession of a post is the most critical that a detachment can have; officers have been frequently attacked at the very time they thought they had nothing to do but quietly take the necessary measures for remaining in safety.

If the party which arrives at a post is to relieve another, the officer that is to be relieved gets under arms as soon as his sentries give notice of the approach of the relief. The detachment being known, they are permitted to enter and occupy the post in the room of those that are to depart; at the same time, the corporals go to relieve the sentries, and the officers and serjeants give the counter-sign, with the detail of all that is to be done at the post by day or night. He ought likewise to get information from the officer he relieves, if the enemy make incursions in the neighbourhood; if their guards are distant, whether cavalry or infantry, and whereabouts placed. After these precautions let him guard against his post being surprised.

The sentries being relieved, the officer that is to go out must form his detachment, and return to camp with the same precautions as in coming. The new detachment remain under arms till the other is gone 50 paces: then the officer is to make them lay down their arms against the parapet, putting their havre-sacks against the gun-locks, to prevent dust from spoiling them, or the dew of the night from wetting the powder. In an open country without fortification, the men must not go to any distance from their arms when they lay them down in the day, and keep them between their knees when they sit round their fires in the night, with the locks inward, to prevent accidents.

SECT. IV. *Of Reconnoitring.*

PARTIES ordered to reconnoitre, are to observe the country or the enemy; to remark the routes, conveniences and inconveniences of the first; the position, march, or forces of the second. In either case, they should have an expert geographer, capable of taking plans readily: he should be the best mounted of the whole, in case the enemy happen to scatter the escort, that he may save himself more easily with his works and ideas.

All parties that go for reconnoitring only, ought to be but few in number. They should never consist of more than 12 or 20 men. An officer, be his rank what it will, cannot decline going with so few people under his orders; the honour is amply made up by the importance of the expedition,

(A) They are peasants subject to the king of Sardinia, who abandon their dwellings when the enemy take possession, and are formed into bodies to defend the Alps which are in his dominions.

pedition, frequently of the most interesting consequence, and the properest to recommend the prudence, bravery, and address of any officer that has the fortune to succeed.

It must be evident that the success of such a commission depends upon secrecy, and that it is impossible to fulfil the intention without keeping out of sight of the enemy. It is incontestable, that a numerous party cannot glide along so imperceptibly as a small handful of men. As these detachments must finish their course quickly, it is necessary that they should consist of cavalry only; but if they are to go far, they may increase each with 30 foot, to remain in ambush about half-way in a wood or covered place, with whom the cavalry can leave their provision they brought with them.

An officer charged to reconnoitre in front, should take his instructions in writing, and set out at such time as to arrive at the place proper for beginning his observations at day-break. Every time that he has occasion to stop, the party should face toward the enemy, and send a non-commissioned officer with two horsemen to run over the neighbouring heights, and closely examine the environs. When near the enemy, avoid stopping in a village.

The officer, and geographer who is supposed to be present, should remark every interesting particular: The heights, woods, ponds, morasses, rivulets, rivers, fords, bridges, roads, crossings, difficult and dangerous passages, by-ways, meadows, fields, heaths, gullies, hills, and mountains; the distance and strength of villages, hamlets, houses, farms, and mills; what sovereign the country belongs to, and what are its productions.

If the enemy comes in sight, the officer should quickly assemble his party, though his reconnoitring be not finished, and let him retire to his infantry, if he placed any; but if not, let him gain some other place that he has chosen for a retreat. After being refreshed, let him go back with the cavalry to finish the reconnoitring; but if he was obliged to return quite to the post, he should not go back till next day. Mid-day is the time of being least incommoded, as detachments are less frequent at that hour. The commanding officer ought always to avoid coming to blows, even though he thinks himself secure of success, unless he happen to be on his return, and near to his post, so that he foresees the grand guard, hearing the firing, cannot fail to run to his assistance. If obliged to engage with a party who are cutting off your retreat, and that no other means is left of turning them, you must risk all without hesitating, by rushing on, and try to save the geographer with the fruits of his commission, especially if the reconnoitring was of importance to the general of the army, and merits the sacrificing a dozen men, which they can easily retrieve on another occasion.

When a party goes out to obtain news of the enemy, it ought to approach as near as possible, but cautiously: day-break is not the time proper for such a purpose, because at that time the enemy send their different parties and patrols to make discoveries; you should therefore prevent them by approaching in the night. You may easily reconnoitre their position and extent by their fires, which they never extinguish at the head of the guards and picquets; and you may easily remark if they are about to change their position, by hearing a more than ordinary noise; besides, as it is easy to approach by night, you may discover a number of things by the light of the fires.

A partisan ought not to neglect to reconnoitre every place round his post for two or three leagues, or farther, if it is possible on the side of the enemy; and for that purpose he should employ the method of Mr Jeney; who, during the campaigns that he made, often examined the enemy's

posts without approaching, in the following manner, which he recommends as infallible.

I suppose myself, says he, with my party at Soest in Westphalia A (fig. 2.), and the enemy posted at Bervick B, two leagues from me. To know the situation of this place without stirring from Soest, I take the map of the country; and from Soest as centre, I draw a circle whose circumference passes half a league beyond Bervick.. I draw a circle of the same size upon a leaf of paper, to make my plan as in fig. 2. and then place Soest in the centre A; and I mark all the villages which I find in the map near the circumference, upon my plan, with the distances and bearings as they are represented in the map, making use of a pencil to mark the places DDD, so as to correct the errors more easily which the map may have led me to make.

Having thus formed my plan, with a scale of two leagues (which is the distance I suppose Bervick), I go to the burgo-master of the town of Soest, where I cause some of the most intelligent inhabitants to come, speaking to them freely, and openly induce them to communicate all the information I have occasion for.

The better to conceal my designs, I begin my reconnoitring by Brokhufen, a village distant from the enemy. I ask the distance from Soest to Brokhufen; if they say it is seven quarters of a league, I correct the distance of my plan which made it two leagues: then I inform myself of all that is to be found on the road from Soest to Brokhufen; chapels, houses, woods, fields, orchards, rivers, rivulets, bridges, mills, &c. If they say that at half a league from Soest they pass the village of Hinderking, I mark that place upon my plan. I ask if the road from Soest to Hinderking is crossed by any other road; if there is any morass or heath; if the road is inclosed, paved, or straight; if there is any bridge to pass, and at what distance. I take care to mark every thing in my plan, forgetting nothing, even to mills, bushes, gibbets, gullies, fords, and every thing that can be got from their informations; which will probably be perfect, because one always knows more than another. I continue my questions from Hinderking to Brokhufen; and advancing by little and little, observe the same method on the roads of the other villages round, marked DDD. In this manner I cannot fail to acquire an entire knowledge of all the places; besides, I find myself imperceptibly instructed in the position of the enemy, by seeing the different routes by which I can approach most secretly.

It is plain that such a plan must be very useful to regulate secret expeditions. It is chiefly useful, not to say necessary, for a commander of a party, who can give more ample and precise instructions to his officers, by accompanying them with a copy of the routes marked out, which they can consult even in the night, if it happens to be clear; by which they will be guarded against being deceived by ignorant or treacherous guides, which occasion the mistakes of so many who go unprovided with such helps.

There is still another means to secure a reconnoitring party; which is, to compose them of people who speak the language of the enemy, and give them surtouts of the colour of a regiment of the enemy, and cockades the same. This scheme may be carried so far as to line the surtouts with the colour of another regiment of the enemy, provided that by turning the surtouts, they appear to be a different corps, and deceive guards, spies, and peasants, and confound their reports.

SECT. V. *Of the Defence of Posts.*

WHEN a partisan has taken every precaution that prudence suggests in reconnoitring a place where he would fix

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a post, he is to take possession in the following manner. The infantry remain under arms in the middle of the place, the cavalry to patrol without, while the commanding officer, escorted by a dozen horsemen, goes to examine the environs to make his arrangements; having sent several small detachments before, to cover him in time of reconnoitring.

Plate
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Having remarked the places proper for his guard, defence, and retreat, as well as the dangerous ones by which the enemy can make approaches secretly to surprise him, he should choose the most convenient in the front of his post to fix his grand guard D (fig. 1.), which must face the enemy. He must mark the heights for this guard to place their vedettes EEEE, and regulate the number according to the exigencies of the situation. In a covered country you must not be sparing of them, and must reinforce every guard. At 50 paces before the front of the grand guard, a subaltern or non-commissioned officer with eight horsemen should be always ready to set out at K, to go and reconnoitre, when the vedettes have observed any party.

The grand guard being fixed, you should form another in the middle of the village, called the *ordinary guard*, composed of cavalry and infantry, placing sentries at the entries and vedettes all round; the last at such distance as to see one another. A picquet should likewise be fixed before the quarters of the commanding officer, which should be near the ordinary guard and the whole corps. In the day, half the cavalry of the picquet must keep their horses bridled and ready to mount; but if the enemy is near, they must remain on horseback, the other half to unbridle till the hour of relief.

According to the arrangement we have given for composing the corps of a partisan, the grand guard may consist of a captain, a first and second lieutenant, a quarter-master, two serjeants, four corporals, a trumpeter, farrier, and 52 private horsemen. The ordinary guard to have cavalry equal to the grand guard, with a captain, a first and second lieutenant of infantry, two serjeants, and 60 men, including four corporals, two lance-corporals, and a drummer: the picquet to consist of the same number of cavalry and infantry as the ordinary guard.

If there is any dangerous place capable of covering the approaches of the enemy in the environs of the post, and out of the circuit of the patrols, there should be a guard placed there, more or less strong according to the importance of the place, and care should be taken to preserve the communication. The guards and picquets being placed, the detachment that was sent out on the roads must be called in, and then go to work to lodge the party in the gardens that open upon the country, and the commanding officer's quarters; beating down hedges, filling up ditches, and levelling a piece of ground large enough to draw up the whole corps. The horses to be put under cover in barns contiguous to the gardens; but in case there are no barns, they may substitute sheds open on one side, that the horses may go out altogether in case of an alarm.

The officers should occupy the houses in the neighbourhood of the sheds, and one of each company remain day and night with the company, to prevent any of the men from entering the village without leave, upon any pretence. The commanding officer must acquaint the officers of his having chosen the place M for the rendezvous in case of a retreat; which ought to be at some distance from the village, and on the side he judges most convenient for retiring to the army. At sunset the grand guard are to return to the post and join the picquet, the one half of each to mount alternately till day-break, and then the grand guard to return to the place they possessed the day before. The sentries and

vedettes should be doubled, and all the passages shut up with waggons placed in two rows, except one for sallying out at, in case of a retreat, made wide enough for the passage of the patrols or the whole cavalry.

The corporals of the ordinary guard should lead the relief of the vedettes every hour, setting off together; but when they come to the passage of the post A, they must separate into two parties, the one to the right to relieve the vedettes BBB, the other to the left for the vedettes CCC; then each of them with the parties they have relieved should go on at their head a quarter of a league, by the two routes pointed out in the plan, to examine the environs, supposing an hour to each. Besides this reconnoitring, the captain of the grand guard should send two patrols in the night. To fill up the intervals, they should set one about half an hour after the corporals, and make the same round. At returning to the post, the corporals to make their report to the officer of the ordinary guard; the conductors of the patrols to the captain of the grand guard.

A little before sunrise or sunset, a grand patrol detached from the corps should be sent under the conduct of an officer to search the whole environs of the post minutely, especially the dangerous places, because at these times the enemy are most likely to attempt a surprise. If the patrols discover them, they will be in a state to repulse them, or at least to harass them till the commanding officer, upon the first notice, draws up the whole corps. The officers should take great care to instruct the sentries in their duty, explaining it to them every time of their mounting, and forbid them to smoke, as the least fire can be easily perceived in the dark, and serve to direct the approaches of the enemy. No sentry to move more than 50 paces to the right, and as many to the left of his post: and let the weather be ever so bad, he must not get under cover. No one to be allowed to go out of the post without leave of the commanding officer; and to prevent desertion or maulauding, the sentries and vedettes must be charged to let no soldier pass.

The vedettes must stop all passengers, and take them to the next sentry, who must call a corporal to conduct them to the commanding officer. If there are a great number passing at once, the vedette at the challenge must hasten to stop them at 100 paces, till the officer has sent to reconnoitre them; but if he finds them to be a party of the enemy, he must fire upon them and retire. At the first alarm, the grand guard and picquet ought to mount, and each of them to detach a subaltern officer immediately at the head of the best mounted horsemen, to go quickly to encounter the enemy. The rest of the grand guard and cavalry of the picquet to follow immediately, led by their captains to sustain the first detachments, to repulse or keep back the enemy as long as it is possible, and give time to the commanding officer to form the whole corps.

If the commanding officer observes that the enemy are of no very extraordinary force, he must without hesitating put himself at the head of his cavalry, and instantly charge them, pouring upon them with his whole force, which is the best way to succeed; and in the mean time, the infantry should form to sustain the cavalry. One essential circumstance should not be forgot here, which is, that at the going of the detachments of the grand guard and picquet, all the infantry of the picquet should march immediately to the place appointed for the rendezvous in case of a retreat, and a strong detachment of cavalry should follow to occupy the place. If it is at the entrance of a wood or some covered place which the enemy may occupy, and thereby cut off your retreat, you must prevent it by fixing the infantry of the picquet in the post, to remain day and night, with a lieutenant

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lieutenant at the head of 20 horsemen to clear round it. If the enemy is too superior, and appears to form an attack on that side, the commanding officer should get there before with all his force to oppose them, till all his detachments join, and then regulate his retreat, as will be seen in the section of the Retreat.

To be better secured in a post which you expect to remain in for some time, and where you find that the enemy will not fail to disturb you, it will be proper immediately to employ some of your people with the peasants, to form some intrenchments in a hurry in the most dangerous places, to have breast-works of felled trees in the woods; heres placed in the fords (see HERSE); pits dug at the entries and plains without defence; so that the cavalry coming full speed to charge you, may tumble in. If there happen to be a bridge either in the front or on the flanks of the post, as at N, by which the enemy can facilitate their approach or retreat, it must be instantly destroyed, unless you find it may be of use, and necessary to fix a good guard on it.

To regulate the attack and defence most advantageously, you should take care to observe the places by which the enemy can approach, and form a plan of operations for cutting off, or taking in flank, the different routes which he can attempt. You should inform your officers, and not fail to hearken to the advice of those whose talents, genius, and experience, render them competent judges of your designs. These arrangements will be of great use in surprising the enemy's parties, who will come from time to time to reconnoitre the post. If the enemy approaches in the night, take care how you attack him; you cannot reconnoitre his force, and you ought to suppose that he is informed of yours.

Do not suffer any suspected woman to approach the soldiers; their visits are dangerous in debauching your people, and the enemy frequently employ them to discover your strength. Let no deserter stop in your post; and if he comes in the night, keep him till day-break is near, and then send him to the army. Every party that approaches your post will profess belonging to you; but if they are not provided with a proper passport from the general, or if you do not know any of the officers, trust neither to their word nor uniform.

These instructions may serve for the corps of a partisan according to the proposed arrangements; but partisans of less force must regulate their precautions according to their strength; and detachments of 30, 50, or 100 men, will seek to post themselves in redoubts proportioned to their number, or in mills, farms, hamlets, detached houses, churches, churchyards, &c. observing that the more a post is extended, the more care and fatigue it requires.

The principal object for an officer that is detached, says Monsieur Vauban, is to foresee every troublesome event. The want of exactness, and the smallest relaxation in the service of out-posts, may have the most fatal consequences; and history furnishes a thousand examples of camps being surprised, and armies cut in pieces, by the negligence of detachments that ought to have watched for their preservation.

The manner of relieving detached posts has been mentioned; but if an officer is detached to a mill or house, let him draw up his party about 15 or 20 paces from the post, and send a serjeant or corporal with five or six men to search the chambers, cellars, and barns: which being done, the sentries must be placed, the post taken possession of, the arms ranged so that every one can find his own without confusion, and the inhabitants lodged in some other house; and then intrench himself according to the rules given.

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If an officer is to fix in a village where it is difficult to examine every place where the enemy may lie in ambush, he should send for the magistrates to come and speak with him, while his party remain drawn up at the end of the village, that they may declare if they know whether there are any of the enemy's parties, suspected persons, or concealed arms in the place; which being done, the sentries are to be placed, and the party to take possession; putting small detachments of five or six men, more or less according to the strength of the party, at the avenues; and examining the church, or any detached house, to make the principal post in case the advanced posts are forced. The men best acquainted with the duty should be planted on the most exposed and distant places, so as to see all the approaches; and sometimes in trees, that they may see at a distance, and remain concealed from the enemy.

If he finds any place near him where the enemy can lie concealed, he should place a corporal with six or seven men there, with orders to fall back upon his post if attacked, or remain till they find themselves disengaged. The soldiers of this lesser post should take care to make no fires, because it would serve for a guide to the enemy to avoid them when they want to fall upon the principal post; but fires may be lighted in the places where they have no guards, to make the enemy think they have them every where, at the same time placing soldiers in ambush where there are none lighted. This scheme may serve for all posts in a level country, where two or three soldiers should be kept going all night to stir up the fires.

The exterior arrangements being made, and sentries placed on the avenues, bridges, and steeples, the works for fortifying the post should be marked out, and executed by the workmen, and the magistrates ordered to send straw to the nearest houses for lodging the soldiers, who must never absent themselves. The officer must always be in readiness to go where his presence may be wanted, and make his serjeants and corporals frequently go the rounds. Monsieur Vauban says, that if an officer is to remain but four hours in a post, he ought to intrench. If he is to pass only some hours in a post, it is a good way to make a parapet of felled trees; or if it is in a village, to intrench a detached house.

The way to guard against being surprised, betrayed, or made prisoner, is to take precautions against all that the enemy can undertake; and whatever distance he may be at, we ought not to found our security on probabilities, but extend them even to possibilities. Neither stranger nor soldier of any other party should be admitted into the post; and the roll should be called three or four times a-day, that the men may not absent themselves: the commander should likewise examine the sentries, to see whether they are acquainted with the detail of their duty, and should show them how to defend themselves in case of being attacked; observing to them, that if the enemy make such a manœuvre, they should oppose such another; if they try this scheme, to resist with that, and deceive them at every step. He may make some of them try to scale the intrenchment, to show the difficulty of mounting it; and by exercising them in this manner, he will prepare them to resist the enemy; it will flatter their vanity, and give them a confidence in him.

An hour or two before day, the men should be kept alert, sitting on the banquette near their arms; and the patrols sent at that time, rather than in the night, to march slowly, to listen attentively, and examine every place round the post where a man can conceal himself.

It frequently happens that two armies are encamped opposite to one another, and have several posts on the same line, and two patrols meet in the night. As it is impossi-

ble to distinguish whether they are friends or enemies, they who first discover the others, should conceal themselves on the sides of the road, behind bushes, or in a ditch, to examine if they are stronger; and in that case to let them pass in silence, and return another way to the post to tell what they have seen: but if they find them weaker, he who commands the patrol should make the signal which is ordered for the patrols of the night, which is commonly a stroke or two on the cartouch-box or butt-end of the fire-lock, which is answered by an appointed number; but a word is the safest. If the patrol does not answer, they should advance upon them with fixed bayonets, fire upon them if they see them retiring, and make them surrender.

If detached opposite to the enemy, it is to be presumed that you may be attacked: therefore small detachments should be advanced between the sentries in the night, about 30 or 40 paces from the post, with their bellies on the ground, in those places where they imagine the enemy may come; with orders to those who command them, to make a soldier reconnoitre any parties that are seen, so as not to confound their own patrols with the enemy's parties, and to retire to the post on the first firing.

In villages there should be great care taken of suspected persons, or of the peasants revolting; and for this purpose, you should make the magistrates order two peasants, the best known in the place, to be put on duty with the sentries of the party, at the passages left in intrenching. These peasants, whom the magistrates must cause to be relieved every two hours, should be charged to recollect all who pass out or in of the village; and both one and the other must be told, that they shall be answerable for all the accidents that may happen from the treachery or negligence of those sentries who have let enemies in disguise enter the village.

They must likewise order the soldiers who guard the intrenchments, to let no peasant approach, and to shut up the passage, with two trees across in the night, and not to open them till day, except for the passing of the patrols. They must examine with iron spits, or their swords, all carts that pass loaded with hay, straw, or casks, or any thing that can conceal men, arms, or ammunition.

An officer cannot watch too carefully to prevent schemes that may be contrived against him; and the attempt on Brisac, in the month of November 1704, is so much to the purpose, that it ought not to be passed in silence. The governor of Fribourg having formed the design of surprising Brisac, set out in the night of the 9th or 10th of November, with 2000 men, and a great number of waggons loaded with arms, grenades, pitch, &c. and some chosen soldiers: all these waggons were driven by officers disguised like waggoners, and were covered with perches, which had hay placed over them, so that they appeared like waggons loaded with hay coming in contribution. They arrived at the new gate by eight o'clock in the morning, under the favour of a thick fog: three waggons entered the town, two full of men, and one with arms, when an Irishman, an overseer of workmen, observing 30 men near the gate, who, though they had the dress, had not the manner of peasants; asked them what they were, and why they did not go to work like other people? Upon their not answering, and appearing confounded, he struck some of them with his cane; upon which the disguised officers run to the arms which were in the waggon next them, and fired 15 or 20 shot at him within half a dozen paces, without wounding him. The Irishman leaped into the ditch, where they likewise fired several useless shot at him, while he called *To arms, to arms*, with all his might.

At this noise, the guards of the half-moon and the gate

run to arms, and would have pulled up the draw-bridge, but were prevented by the waggons which the enemy had placed upon it. The officers and soldiers who were in the waggons, rushed out with their arms, and having joined the rest, attacked the guard commanded by a captain of grenadiers; but being repulsed, and five of them killed, the rest were dismayed, and fled either into the town, or out into the country. The captain of the guard made the first gate, which was a grate, to be shut, across which the enemy, who were upon the bridge, fired at all who appeared; and having left the half of his guard, he mounted the rampart with the other half, and continued firing upon the enemy. A lieutenant who commanded 12 men of the advanced guard, was attacked at the same time by an officer who presented a pistol to his breast; but snatching it from him, he fired it at him, and killed him: this lieutenant defended himself to the end of the action; but having received several wounds, he died that day.

Upon hearing the noise of the surprise, the commanding officer of the place distributed his garrison to their proper posts: and having made every disposition necessary for his defence, the enemy saw that their design had failed, and retired in disorder, leaving a number of waggons behind them, and more than 40 soldiers who were killed or wounded. Such was the enterprise on Brisac, which failed by a trifling accident.

This example, and many others which might be cited, show that an officer who commands in a post cannot be too much on his guard to prevent his falling into the snares which the enemy prepare for him, as the seizing of a post, of however little importance it may seem, may be attended with the most troublesome consequences.

In an enemy's country, the inhabitants are always ready to revolt and betray; therefore the commanding officer ought to take one or two of the magistrates children, or three or four of the most considerable families of the village, and keep them in the principal post as a pledge of the fidelity of the inhabitants. The children (to whom they should take care to do no manner of hurt) should only be kept half a day each, and changed for some others. The commanding officer should forbid the inhabitants to assemble in taverns or public walks, or any place whatever, and cause these orders to be fixed up at the door of the church. If they are seen to stop and converse at coming out of church, or in the market-place, let the patrols oblige them to retire. The tavern-keepers and all the inhabitants must be forbid to receive any stranger without acquainting the commanding officer. None to be permitted to stir abroad after retreat beating, on pain of being killed by the sentries who see them, or stopped and conducted to dungeons by the patrols; who ought to march slowly, stop from time to time to hearken if they hear any noise, go over all the quarters that are marked out to them, and give an account of every thing that they have discovered that can cause any alarm in the post.

If fire breaks out anywhere, or the inhabitants quarrel among themselves, an officer should take care how he sends a party to their assistance, because these are frequently snares of the enemy to divide the strength of a detachment on purpose to attack them; he should therefore ring the alarm bell, make all the different posts get under arms, and order those who command them, to make the soldiers remain armed against the parapet, so as to observe what passes without the village. The soldiers of the principal post should likewise get under arms, and the officer detach four or five men with a serjeant or corporal to part the fray, or set the inhabitants to work in extinguishing the fire.

As all the necessary precautions for the safety of a post are

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are too many to have them executed by giving them verbally, the commanding officer should give his orders in writing, and have them fixed up in all the lesser posts. One thing to which officers who are detached to a village should give particular attention, is, not to vex the inhabitants by making them furnish too much: whatever they are allowed by the general to exact, such as firing, forage, candle, &c. for the guards, should be demanded in proportion to the abilities of the inhabitants; and an officer cannot be too delicate in preserving the character of a gentleman in ordering contributions, and preserving the inhabitants from being robbed or treated ill by the soldiers.

It is not sufficient for the preservation of a post, to raise intrenchments, nor to take every precaution against being surprised. As the enemy must attack with a superior force, your dispositions must be made in such a manner as not to confuse one another, and every one being properly placed, contributes to the common safety. If it is a redoubt, or other intrenchment of earth that is to be defended, seven or eight trees with their branches should be kept in reserve, to throw into the breaches the enemy may make, and the parapet kept well lined with men, who ought not to fire till the enemy are on the glacis. They should be provided with grenades to throw in the midst of the enemy who have jumped into the ditch, nay even ashes or quicklime, whose burning dust cannot fail to blind the enemy, should be had if possible. If the strength of your detachment will admit of it, eight or ten soldiers should be placed in the ditch (on the opposite side from the enemy), so divided as to take the enemy on the flanks, who have jumped into the ditch. This kind of sally, by running round upon the right and left at the same time, must astonish an enemy who could not dream of being attacked.

If there are heights from whence the enemy can crush your people with stones, they must be occupied with eight or ten men covered with a breast-work, to prevent the enemy from possessing them, or guard against them, as has been formerly directed.

In the defence of houses, mills, &c. as well as regular fortifications, the men should be made acquainted with the different manœuvres they may employ for their defence; without which they do not foresee the intentions of their officer, and may counteract one another by their being in disorder.

The obstinate defence of a post is the action where an officer detached singly can acquire the greatest glory; the resistance not proceeding from the number of soldiers destined to defend it, but from the talents of the officer who commands. It is in him that the strength of the intrenchment lies; and if he joins to determined bravery the abilities necessary on these occasions, and can persuade his soldiers that the lot the enemy prepares for them is a thousand times worse than death, he may be said in some sort to have rendered his post impregnable.

In the defence of detached buildings, there are so many different retreats, that it becomes an arduous task to succeed in an attack, when brave people are to defend them. They have the loop-holes on the ground-floor to defend, when beat from the intrenchments without, and may resist great numbers, by retiring gradually to the different floors of the house, where they should have large buckets of water provided to throw upon the enemy, which, though it may appear trifling, is one of the most disagreeable that can be opposed to the assailants; for at the same time that it wets their powder, arms, and clothes, it hinders them from seeing what is doing above, prevents every scheme for setting fire to the house, and may oblige them to desist from the attack.

Having observed that the defence of a post does not depend upon the soldiers who are destined for that service, but upon the officer who commands, the following example may serve to confirm the observation, and will at the same time show the utility of having stones collected to throw over upon the enemy, as formerly recommended.

In the month of September 1761, captain-lieutenant Alexander Campbell of the 88th regiment, with 100 men under his command, was pitched on to defend the remarkable post near Cassel in Hesse, called the *Hercules*. Monsieur Roziere, the celebrated partisan and engineer of marshal Broglio's army, with 600 infantry and four squadrons of cavalry, arrived in the neighbourhood of the post the morning of the 22d; and having beat a parley, surrounded and carried off the two men who were sent out to receive the message. After having examined them separately, he caused a detachment, under cover of his musquetry from a hill that was opposite to the principal passage, to advance and mount the stair, three men abreast; which they did so slowly and without any interruption, that the whole stair of about 100 steps was full of men, when Captain Campbell (who had made an excellent disposition for the defence of all the parts of his post), having some chosen men at each side of him, waited to receive those who advanced first upon their bayonets, and firing at the same time, gave the signal for the rest to throw over large stones which he had collected and disposed for that purpose; which made such havock, that Monsieur Roziere, startled at the unexpected reception, and despairing of success, wished to get his party off. Captain Campbell seeing the destruction of the enemy without a man of his being hurt, and that he could renew the reception as often as they chose to repeat the attempt, was elated with his success, and encouraging his men, when he happened to move from the wall that covered him, and received a musket shot from the opposite hill, which entered a little below the left temple and came out at the same distance below the right; upon which he fell, and the party beat the chamade and surrendered. After two hours possession the French retired, carrying off the prisoners, and leaving Captain Campbell, whom they thought dead, to be saved by our troops, who soon took possession again, and sent him to be recovered, and to display new merits in his profession.

If the enemy take cannon to force the post, it does not appear how it can be resisted, unless the house is low, and they cannot range round the intrenchments, as every shot can make a large opening in bad built houses, and may crush the besieged. The only means then to shun being massacred is to capitulate, or to rush out briskly upon the enemy when they least expect it. The first is not resolved upon but when the honours of war can be obtained, which is to march out with drums beating to return to the army with a proper escort. But if this capitulation cannot be obtained, the besieged have nothing left consistent with true bravery, but to rush out sword in hand, and cut their way through the enemy. The necessity of conquering changes the brave man into the determined soldier, which gives him the means of retiring to the army or some neighbouring post.

If a post is to be abandoned when it can be no longer held, and you are going to make the sally, you should continue to fire with spirit, taking away barricadoes from the door through which you are to pass with as little noise as possible. When they are assembled, the whole party should go out close together, rushing with their bayonets to the place the officer thinks the least guarded. You ought never (says Mr Folard) to wait for day to execute these sallies, which cannot succeed but in a dark night, by which you

easily conceal from the enemy the road you have taken; for which reason you should not fire, but open to yourselves a passage sword in hand, lest the enemy come where they hear the noise.

Officers should be attentive to distinguish between the true and false attacks, and not despair when beat from their first intrenchments. The defence of posts is so easy, that it is surprising they do not hold out longer than they commonly do. There wants only resolution and vigilance, taking every advantage of the ground, and persuading the soldiers that nothing but the most manifest baseness can let the enemy penetrate. The example of Cremona, surprised by prince Eugene in 1702, will remain a proof to posterity of what determined bravery can do; and show, that though an enemy is master of half the ramparts, and part of the town, he is not master of the whole.

Prince Eugene having formed the design of surprising this town, which was defended by a garrison of French and Irish, got some thousand Austrian soldiers admitted at a secret passage by a priest. These troops seized the two gates, and a great part of the town; the garrison buried in sleep were awaked by the assault, and obliged to fight in their shirts; but by the excellent manœuvres of the officers, and resolute bravery of the men, they repulsed the Imperialists from square to square, from street to street, and obliged Prince Eugene to abandon the part of the town and ramparts of which he had been in possession.

Posts have often resisted the first and greatest efforts of the assailants, and have yielded or been abandoned to subsequent attacks, though much less spirited. How comes this? It is owing to an officer's not daring to abandon his post at the first attack: he repulses the enemy, because if forced they will be put to the sword with their whole party; but when the enemy comes back, he thinks he has nothing to reproach himself with, having defended it for some time, so retires, or surrenders. Since he could repulse the enemy when in good order and quite fresh, how much more easy and less to be dreaded when they return harassed with fatigue?

Is not the great cause of misconduct among military men the want of encouragement to excite emulation? An officer who is not protected, who is never sure of the least favour, neglects himself, and takes less trouble to acquire glory, rarely heard of, though merited by the bravest actions, than to enjoy the tranquillity of an ordinary reputation.

It is not expected that an officer who is placed in a post should seek to engage; but that he should steadily resist when he is pressed, and die rather than abandon his intrenchment.

Historians have been very silent about posts being well defended; though the lessons to be drawn from them may be more generally instructive, and as agreeable to read, as those left us of the best fortified places of a state. We are astonished at the account of 100,000 men perishing before Ostend in 1604, and their general, the archduke Albert, with the ruins of his army, not making himself master of it, till after a three years siege: nor is our wonder less, to see Charles the XII. of Sweden, in the year 1713, with seven or eight officers and some domestics, defend himself in a house of wood near Bender against 20,000 Turks and Tartars.

Several historians mention the defence of this house because it was done by a crowned head; but brave actions, whoever are the authors, should never be buried in oblivion, as they excite emulation, and are full of instruction.

SECT. VI. *Of the Attack of Posts.*

ALTHOUGH the taking of a post is always difficult when

you have to do with people who know how to defend it, nevertheless you may succeed in attacking them by surprise and stratagem. We ought never to form a scheme for an attack upon simple speculation, because from reasoning we often think that things are feasible, which we find impossible in the execution. When you intend to undertake an action of this kind, you ought to form a just idea of it, by examining all the branches separately, and the different means you can use, so that, by comparing them together, you may see if they concur, and answer to the general purpose; and lastly, you are to take such measures as may in a manner render you certain of success before you begin.

As it is not the practice of the army to choose a particular officer for the attack of an intrenched post if he does not offer himself, so an officer should not embark in such an enterprise, without having examined the means of succeeding, and being capable of showing the general a plan of what he has projected, to see if he will consent to the execution of it. If the general approves the plan, he must beg leave to go to reconnoitre the post with a man or two, that he may take his measures more justly.

When he has been to reconnoitre, as is directed in a former section, and has got every necessary information, he should go to give the general an account of his discoveries, and receive his last orders for the attack, for the soldiers of his party, and for those who are to march to sustain him.

The choice of men that are to go upon the attack of a post, is so much the more essential, as the success of the enterprise depends on it. None but volunteers of determined bravery ought to be taken, men who are not stupid, and have no colds upon them; because he who does not attend to the orders of his officers, runs on with blind zeal; and he who coughs or spits, may discover the party to the enemy's sentries, and cause the best concerted scheme to fail. As to those who are to support them, they may be taken according to their rank in the guard or detachment, as the general judges proper.

The disposition for an attack must depend on the discoveries that are made, so as not to be obliged to return in the middle of the execution. The men being chosen, they must be inspected, to see that nothing is wanted which can contribute to their success; because, if the post is fortified with an intrenchment of earth or fascines, the two first ranks should be provided with spades and pickaxes beside their arms; if fraised or pallisadoed, they must likewise have hatchets; and if covered with masonry, they must have ladders.

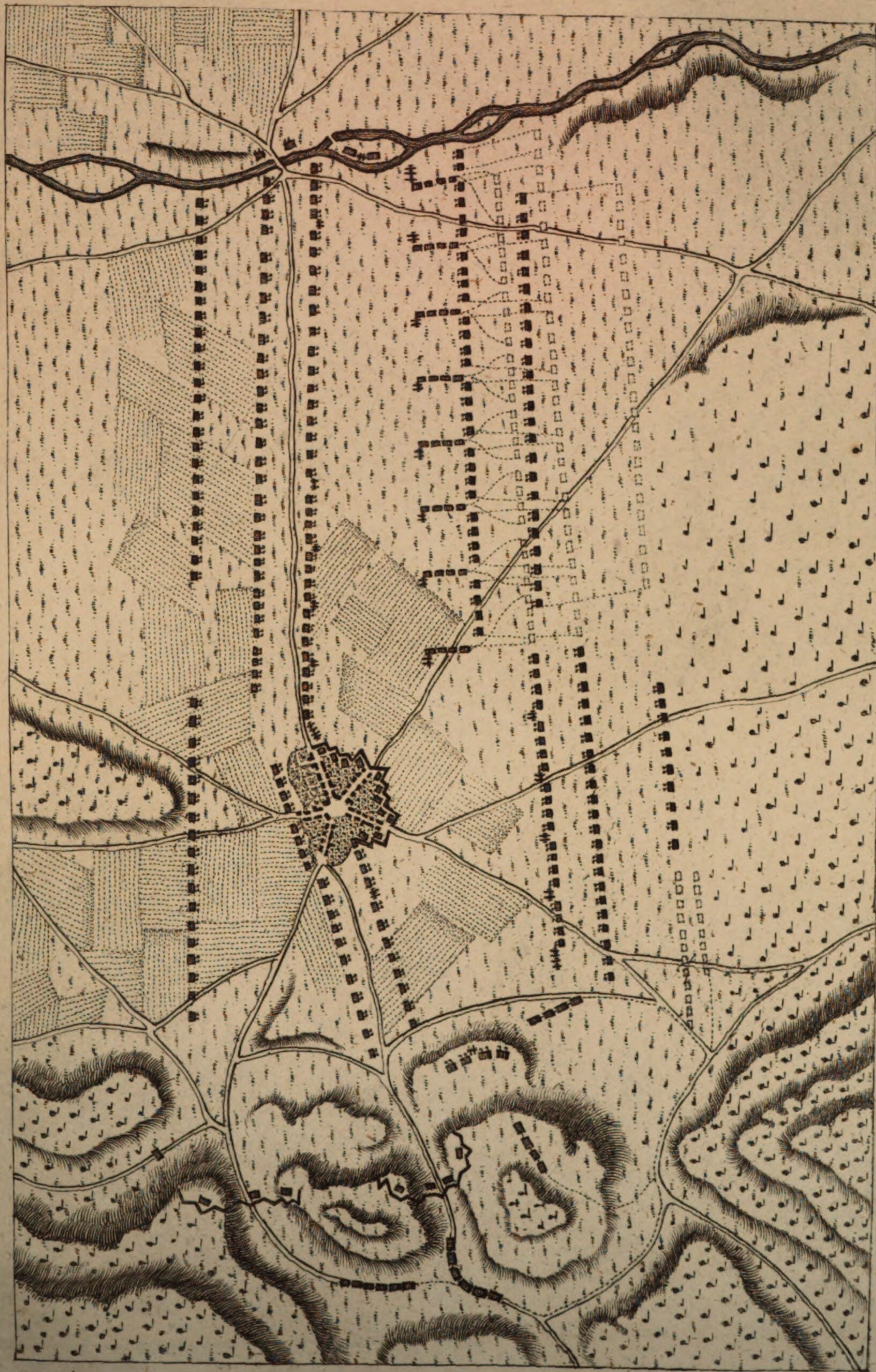
The men should be in their waistcoats, to be less constrained. If they propose to make one or two true, and as many false attacks, so many platoons must be formed of the chosen party, as they are to make true ones, and the sustaining party to make the false attacks, so as to divide the enemy and share their fire. A man must be placed at the head of each platoon, who is capable of commanding them, and, if possible, the same who had been employed before to make discoveries, as he may more easily guide the division. The orders which should be given to those leaders, are to march together to the place where they are to separate, and then each to go to the spot which is appointed for him, in the neighbourhood of the post, and wait there, with their bellies on the ground, for the signal to jump into the ditch and scale the post.

If you are to be conducted by spies or guides, they should be examined about every thing that can be of use, before they are employed, especially about the road by which they propose to conduct you. The reason of this

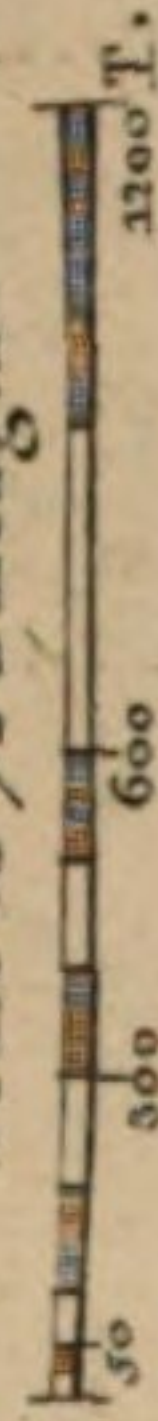
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Plate DXXIII.

Plan of an Order of Battle, IVth Disposition.



Scale of $\frac{1}{2}$ a League.



A. Bell, Print. Wm. Wall, Sculptor, fecit.

Fig. 6.

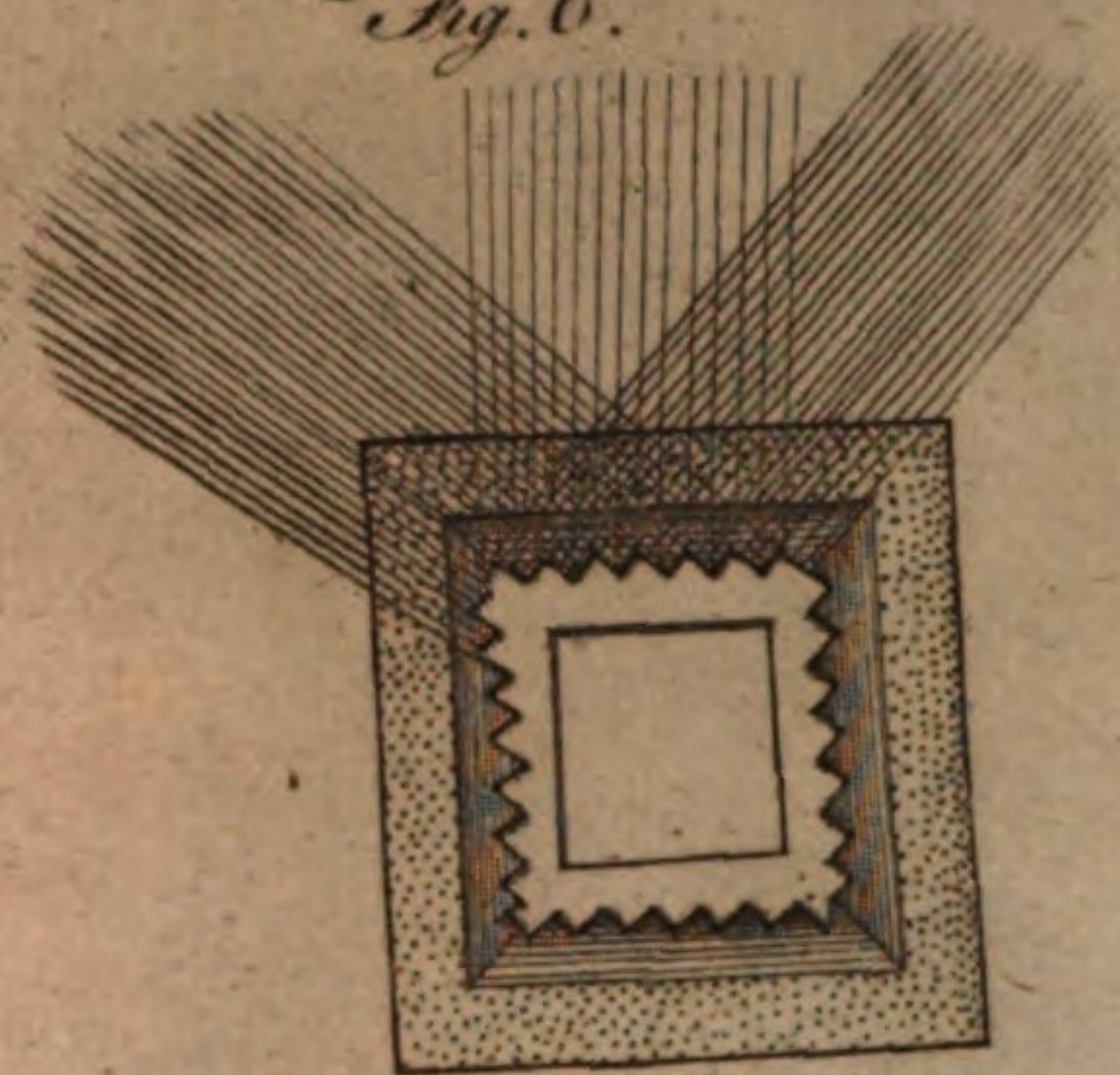


Fig. 5.

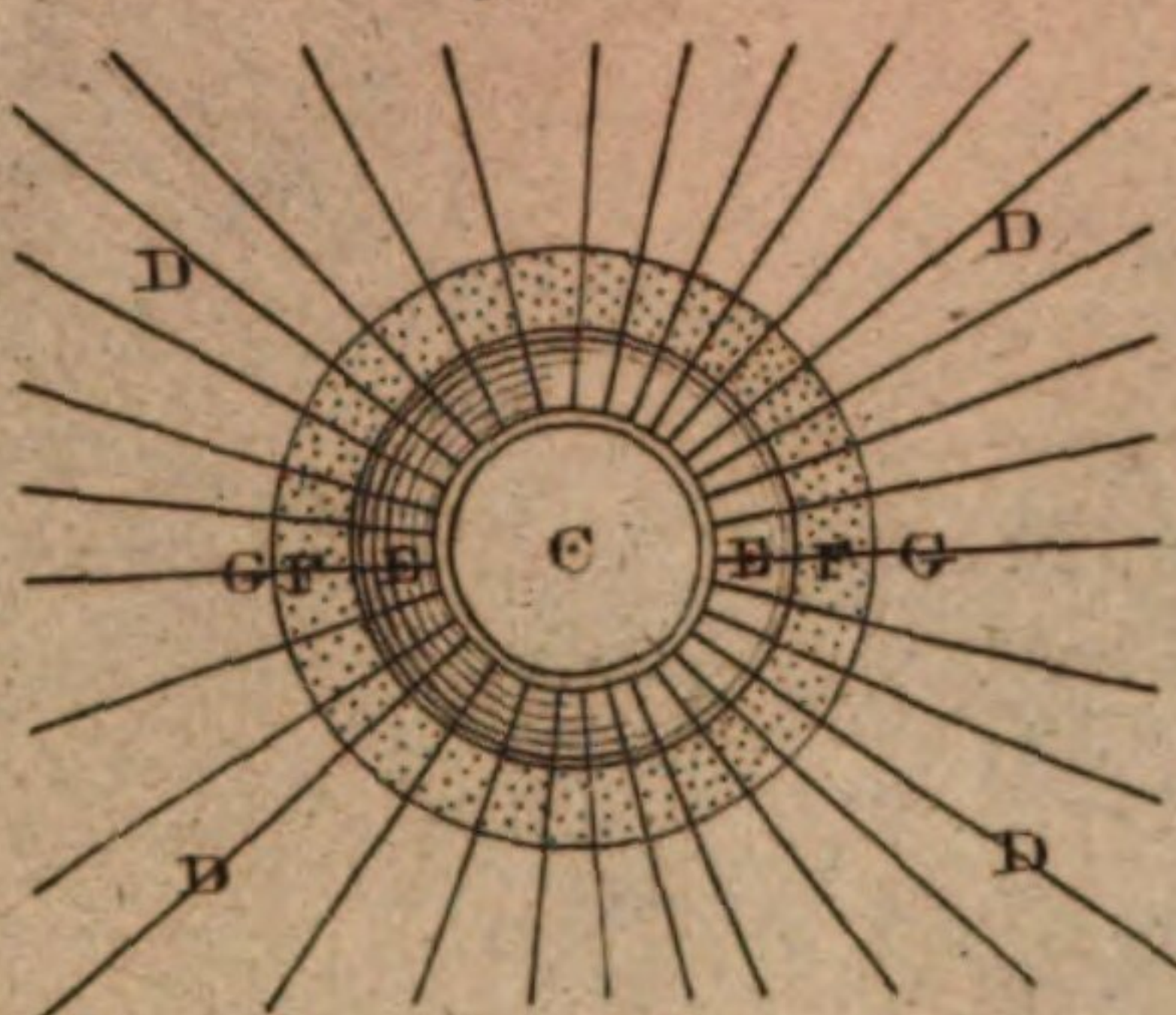


Fig. 7.

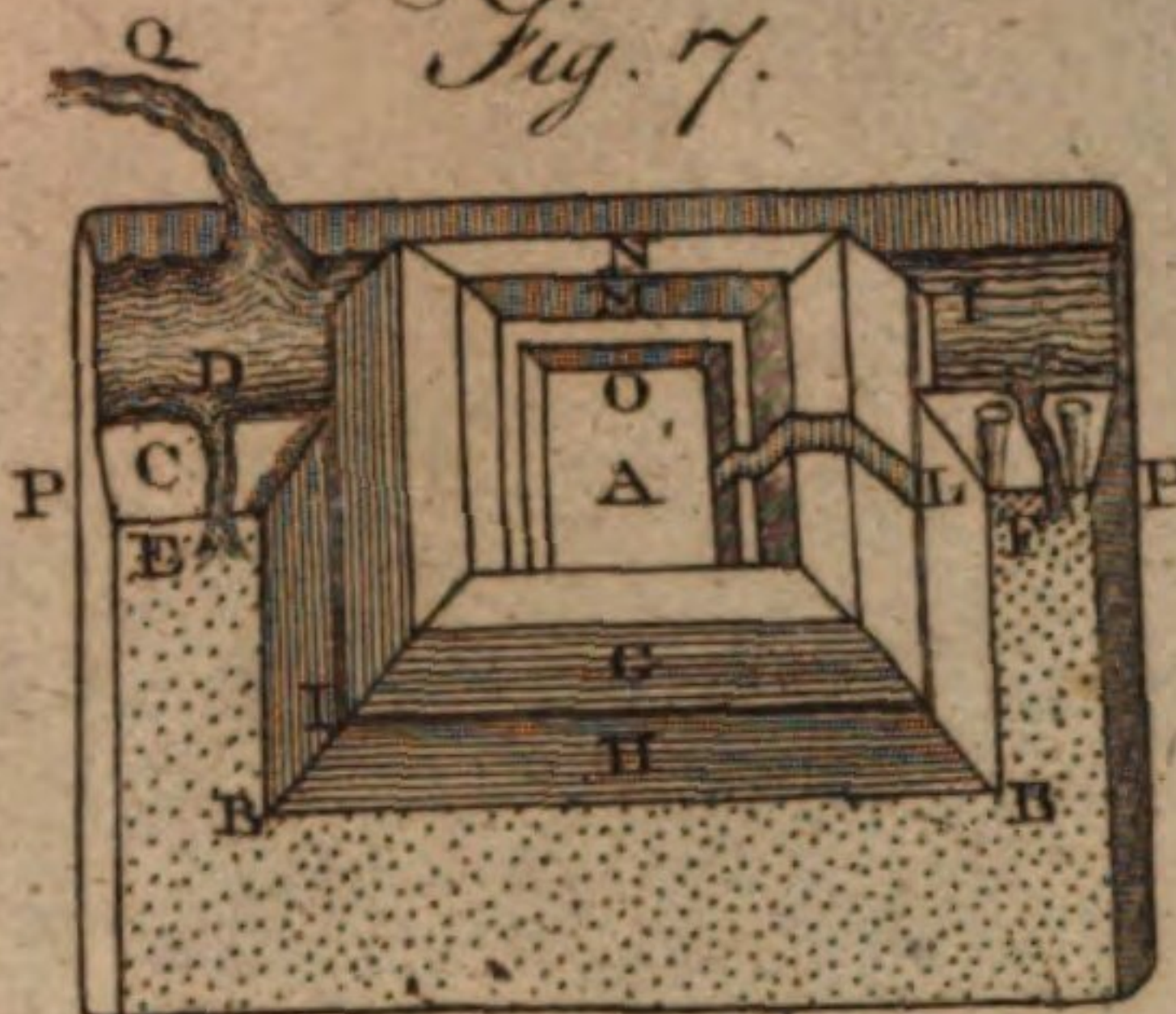


Fig. 3.

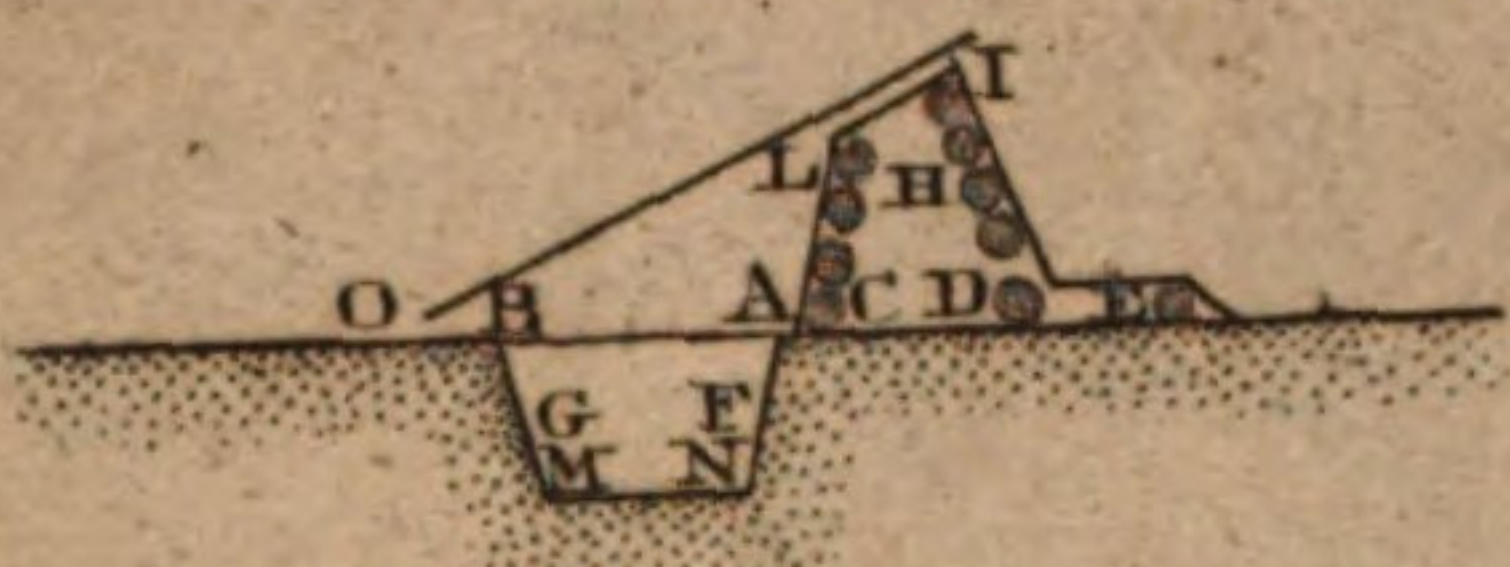
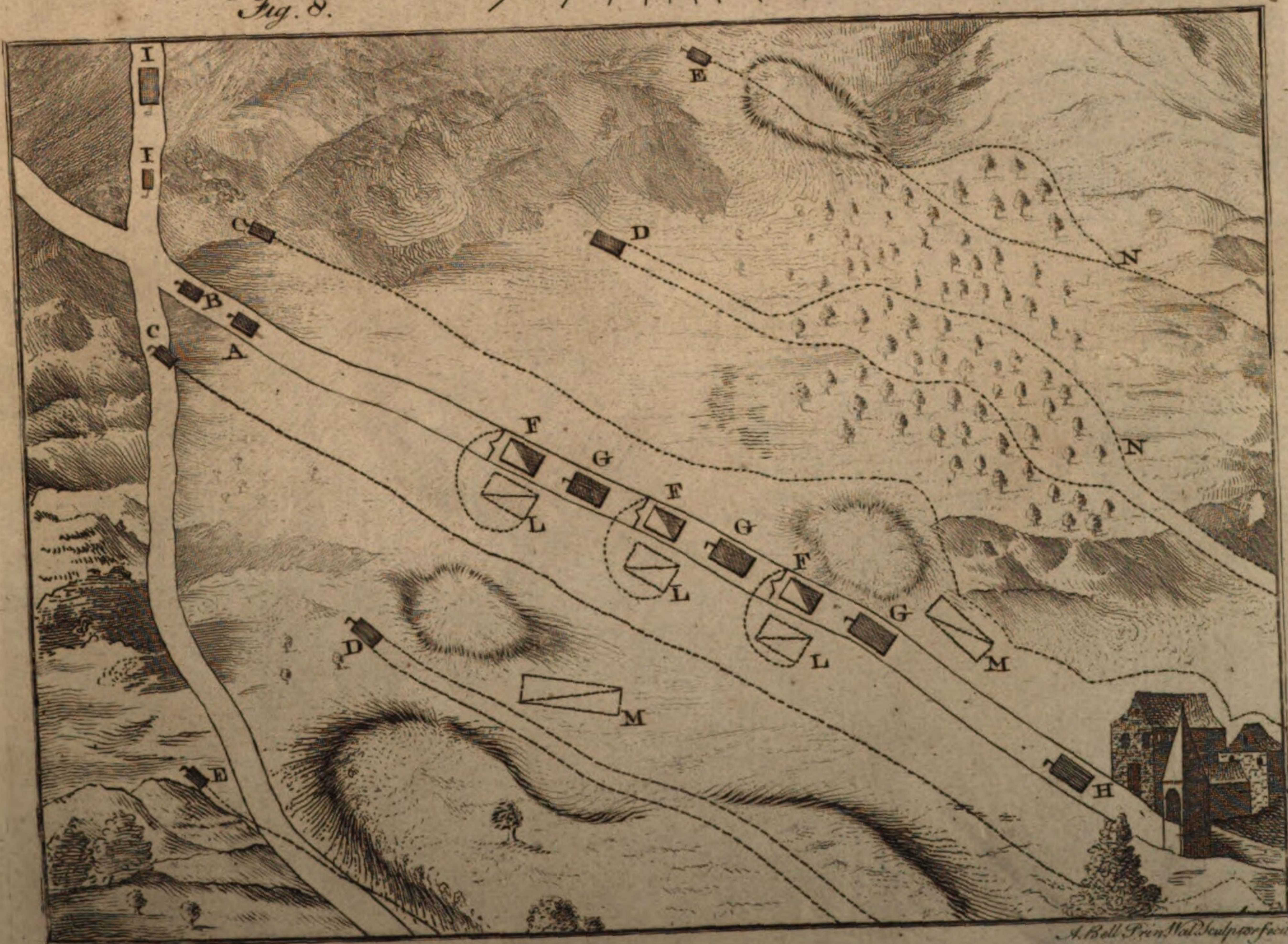
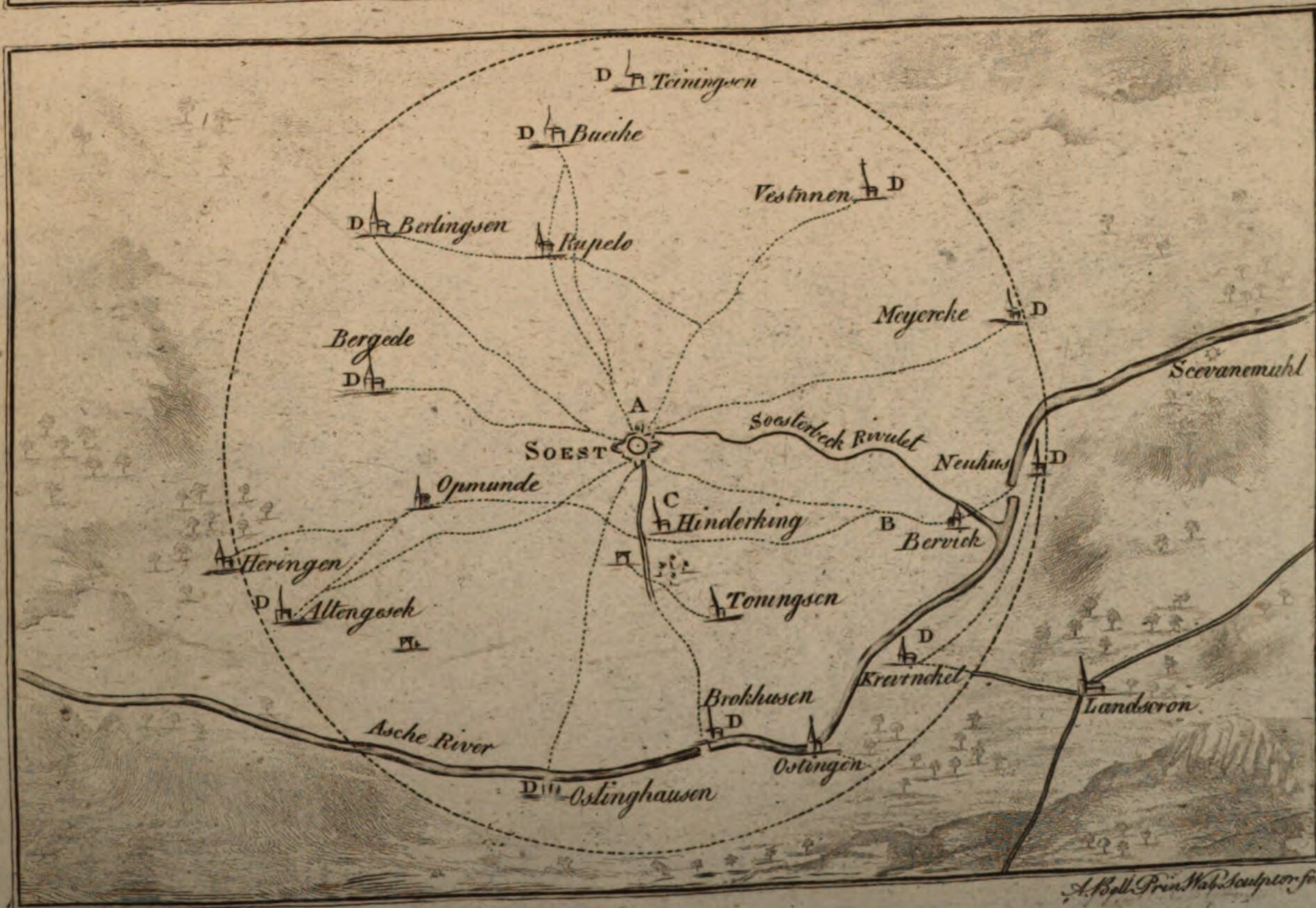


Fig. 8.





A. Bell Prin. Wals. Sculptor. fecit.

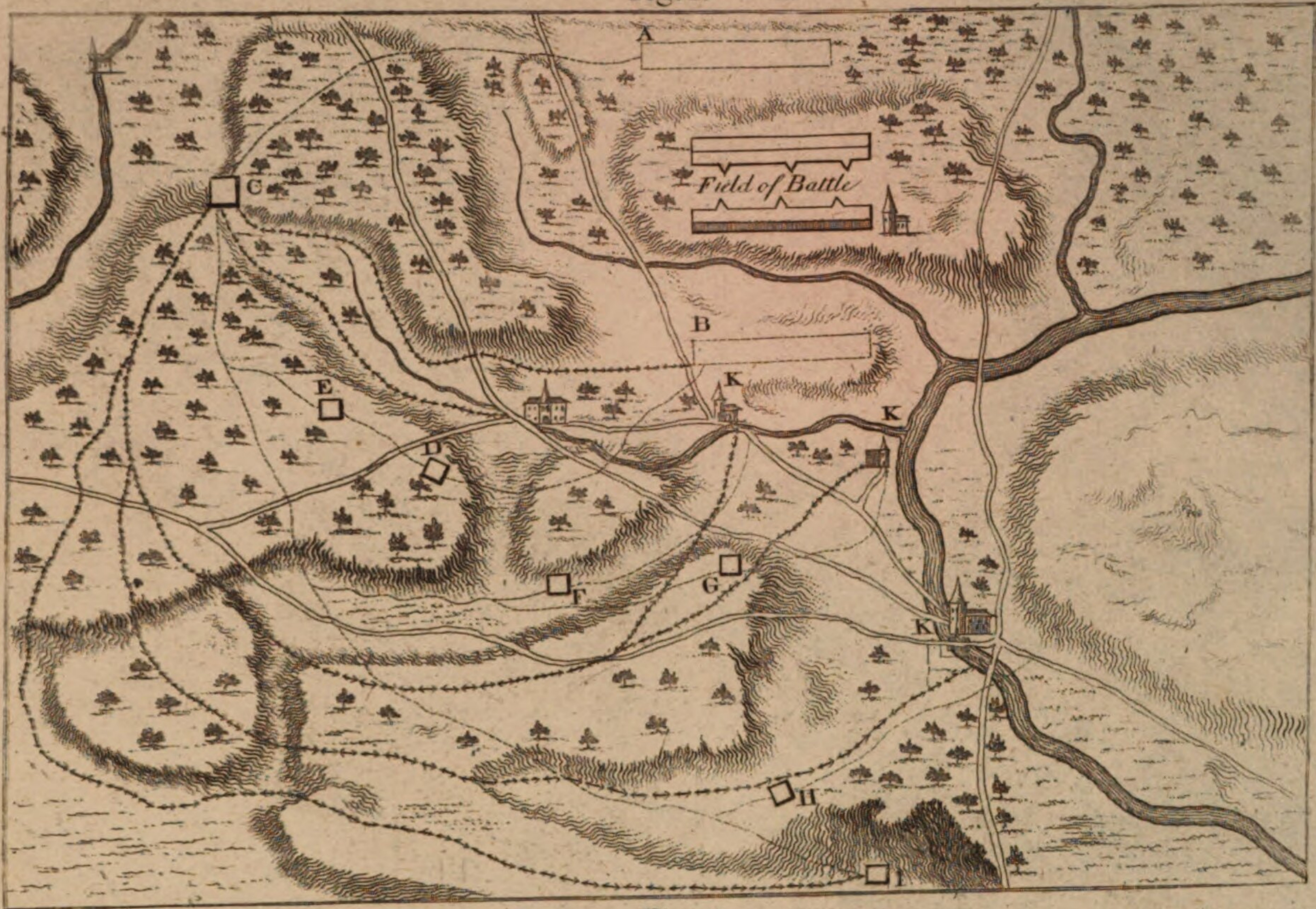
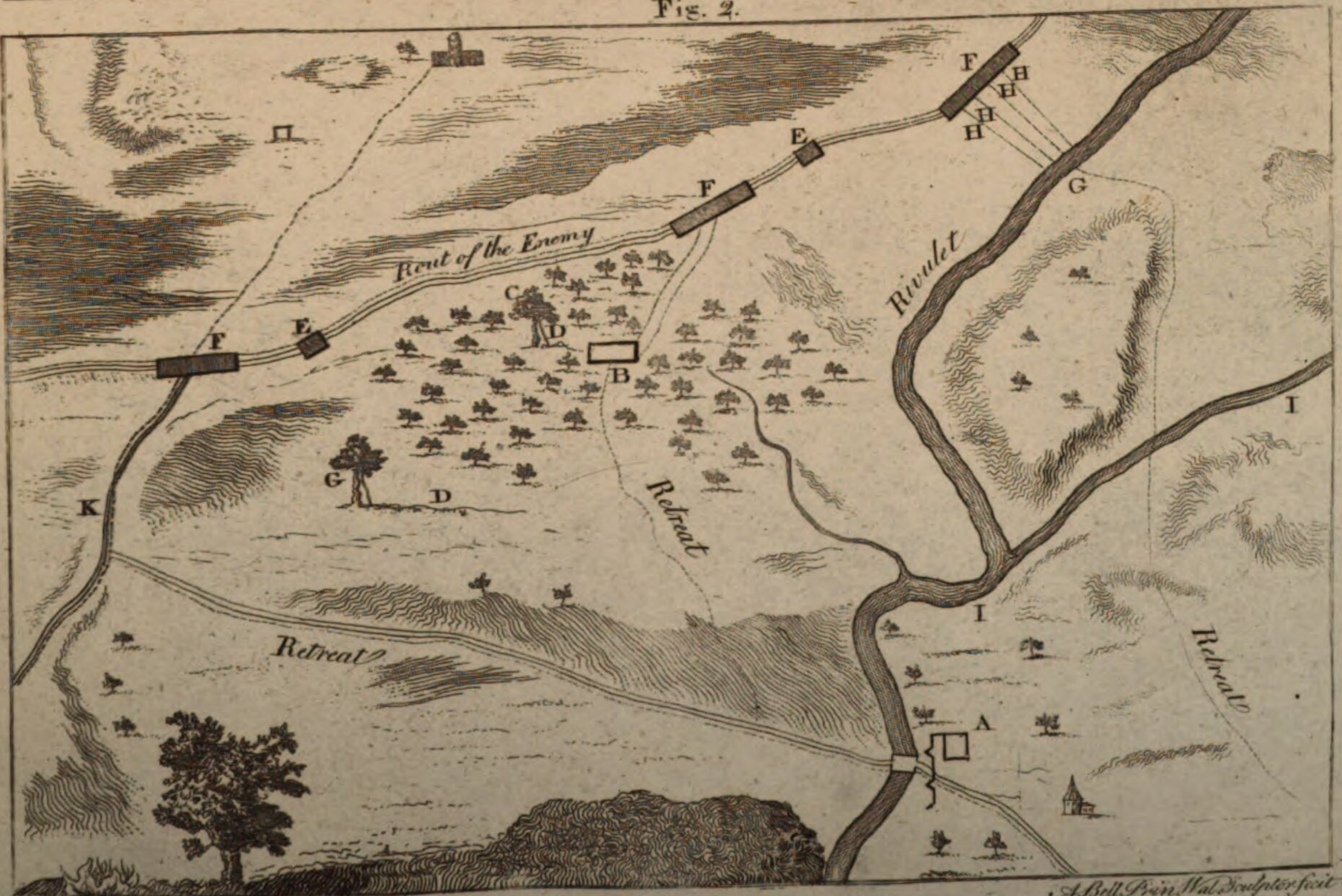


Fig. 2.



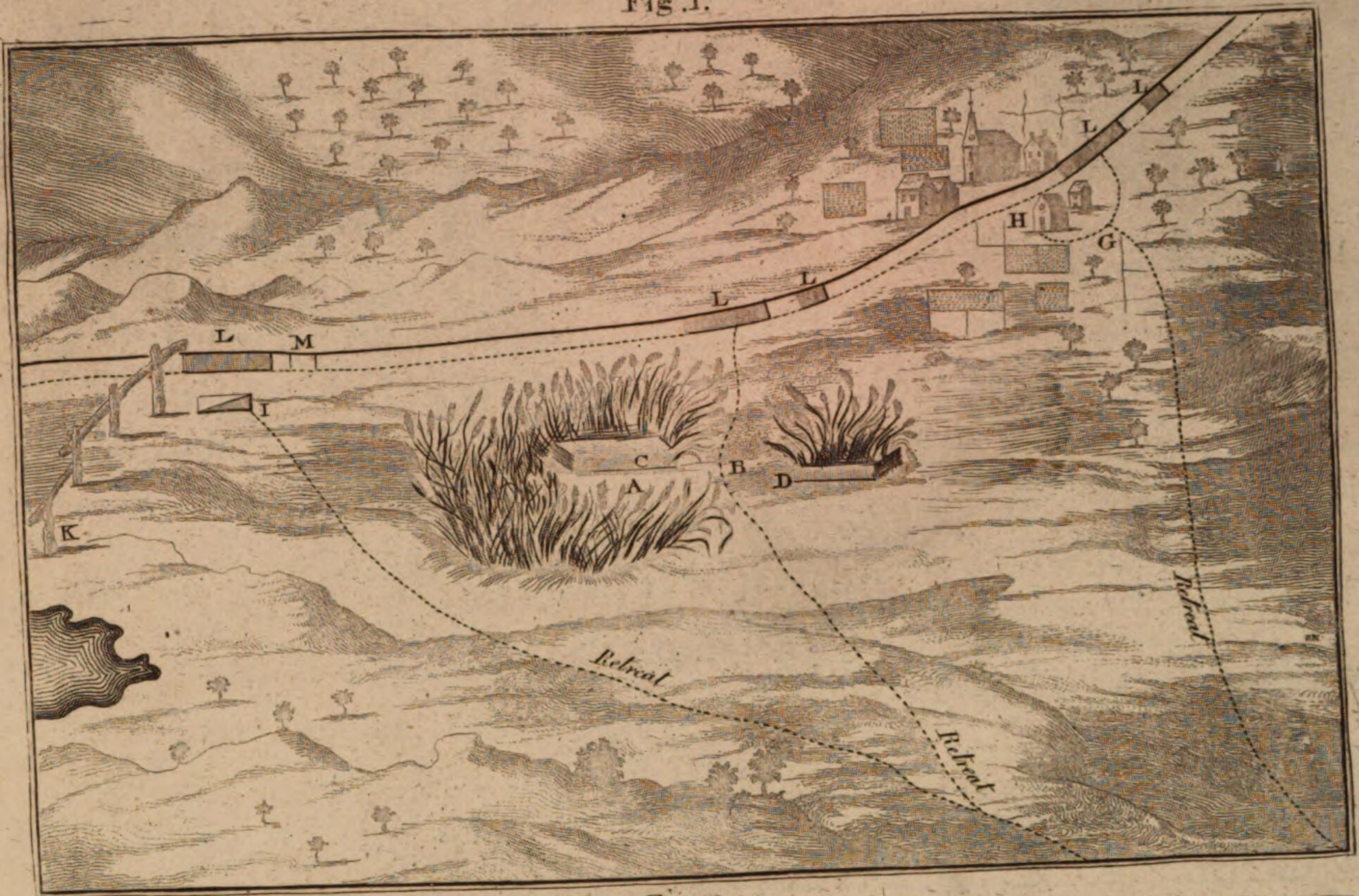


Fig. 2.



WAR.

Attack of Fortified Places.

Elevation of the Gabion.

Plan of the Gabion.

Fascine.



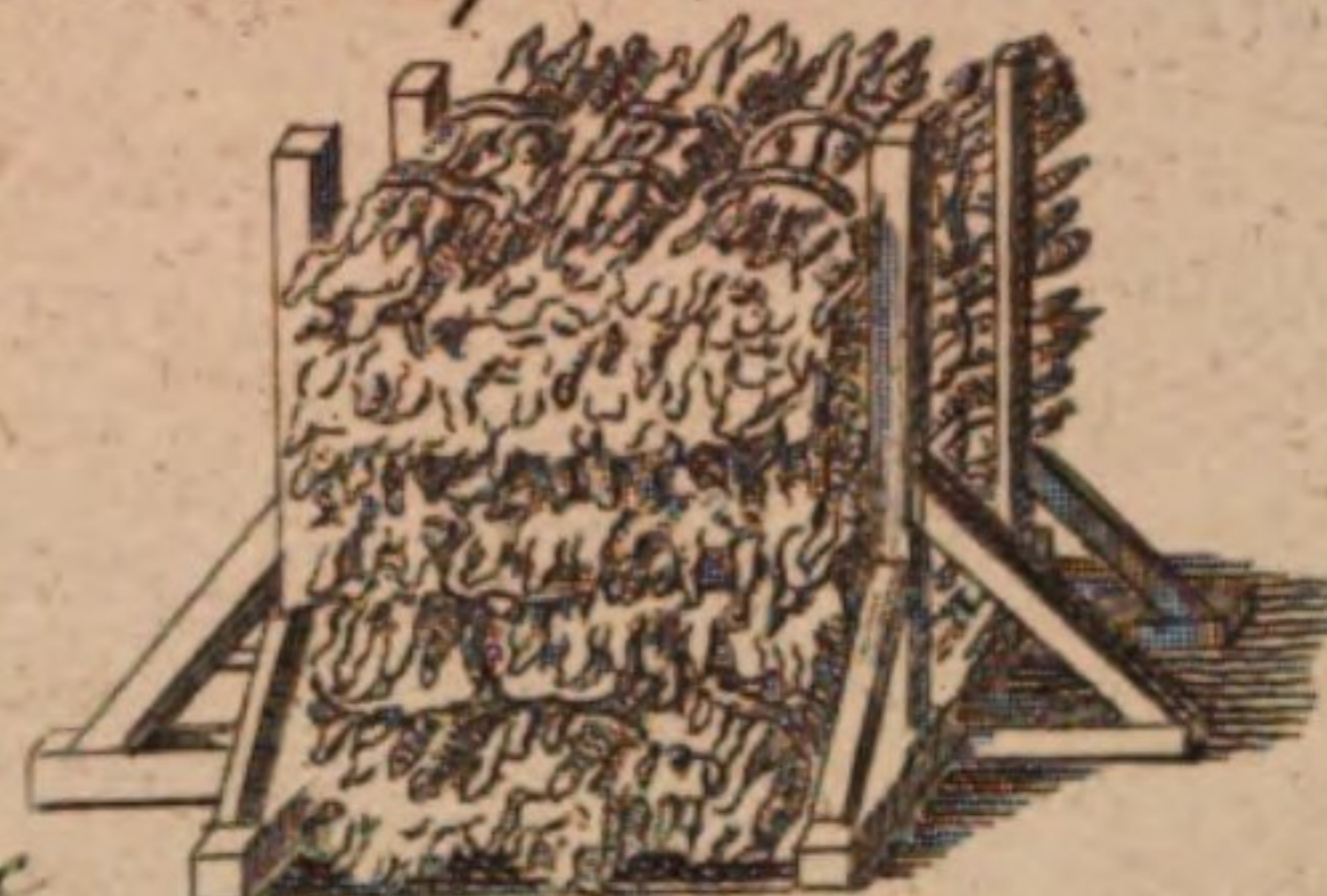
Sand Bag.



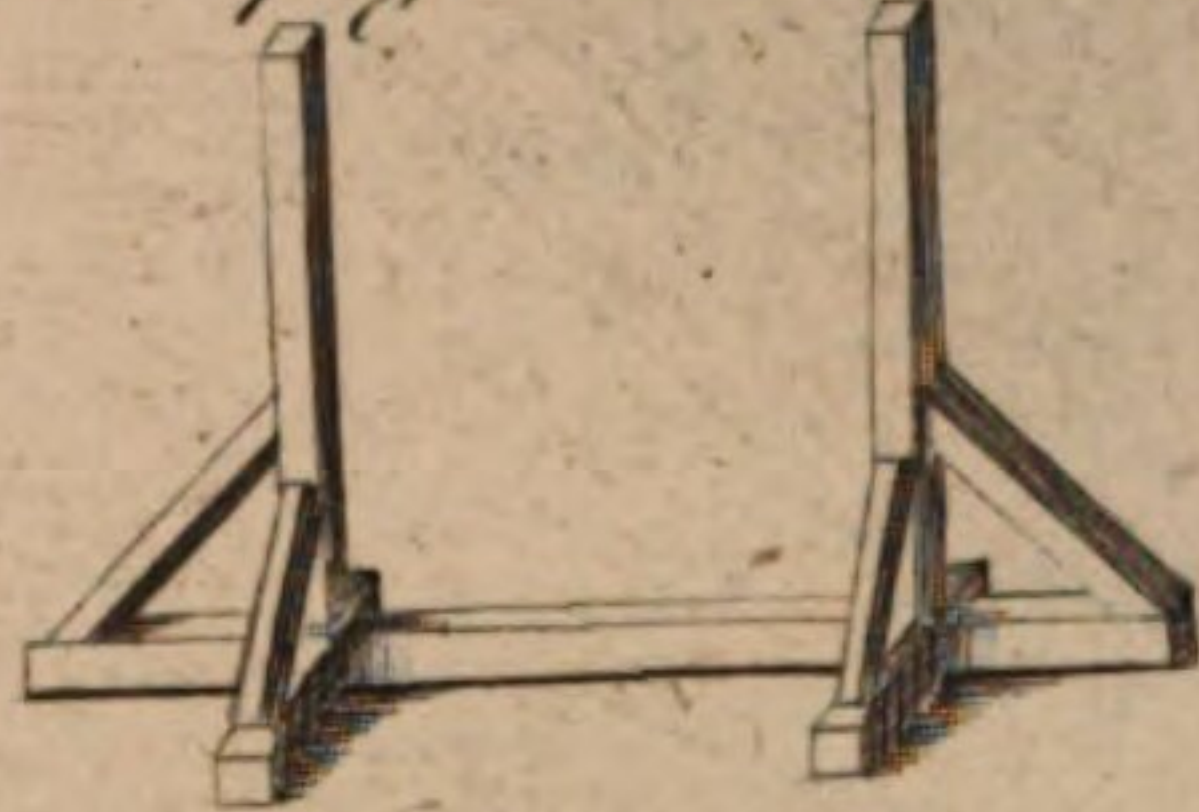
Empty Sand Bag.



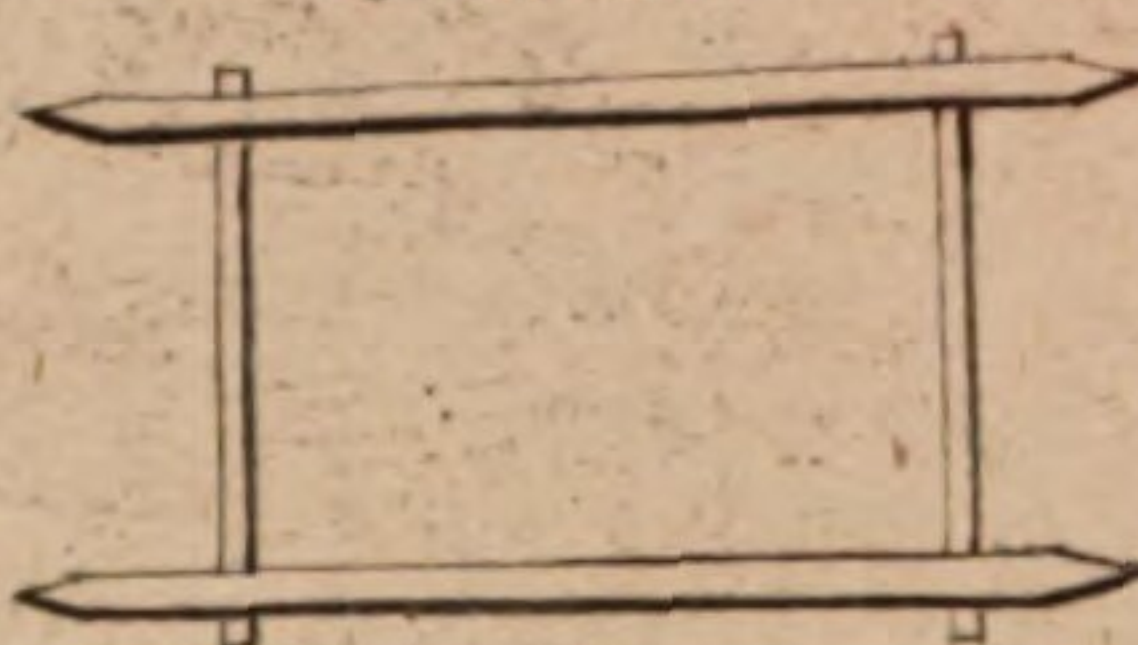
Chandeliers filled with Fascines.



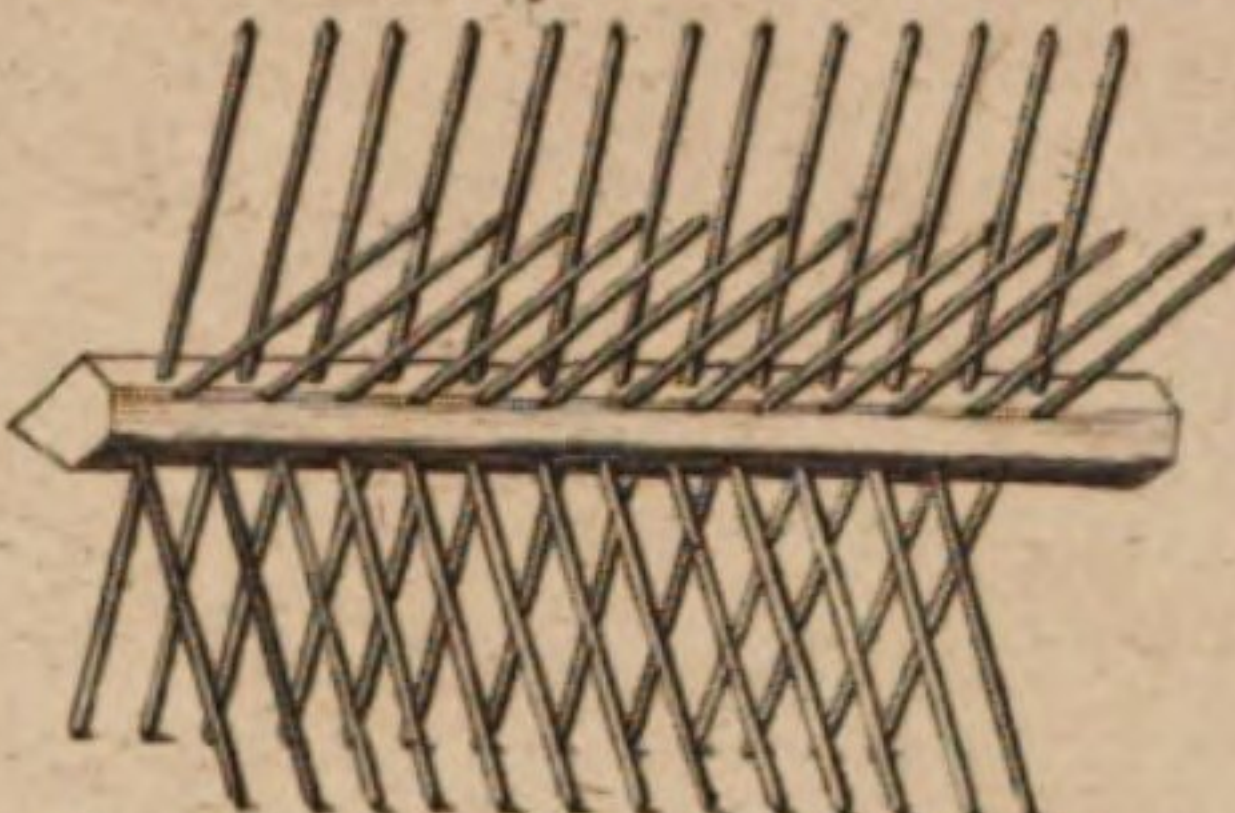
Empty Chandelier.



Blind.



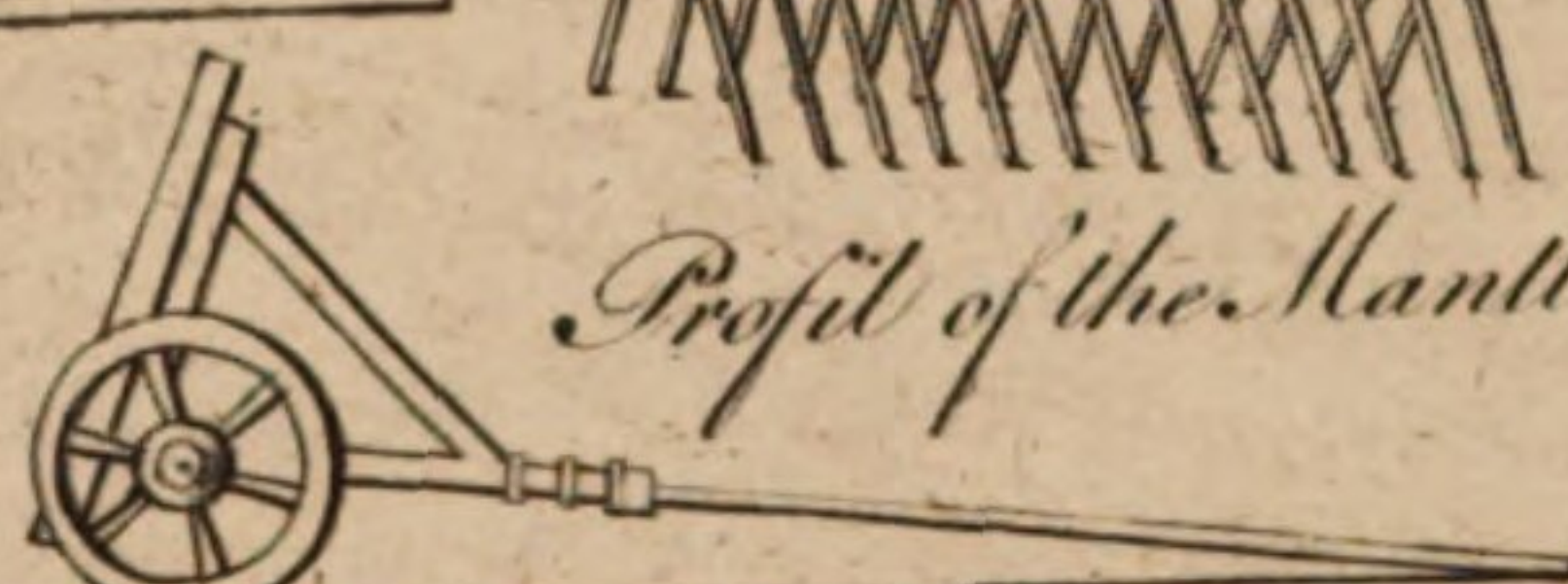
Chevaux de frise



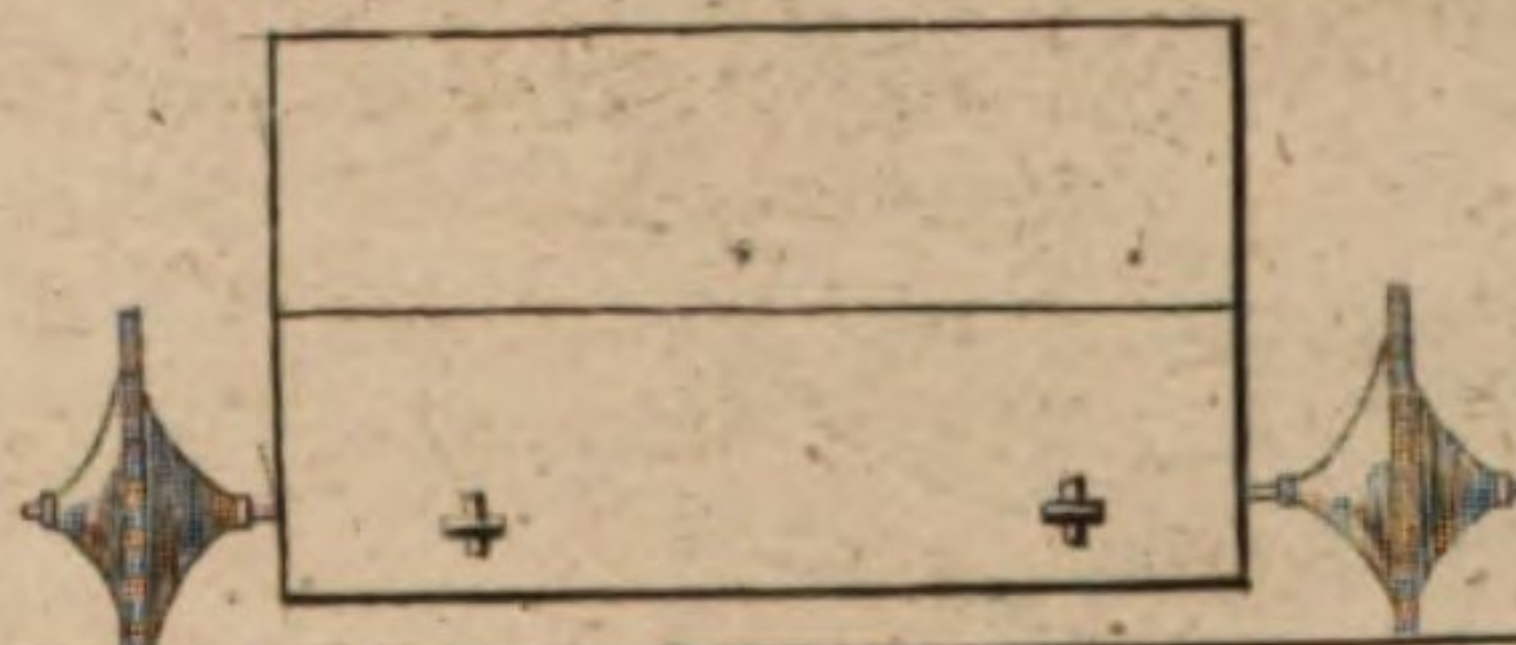
Plan of the Mantlet.



Profil of the Mantlet.



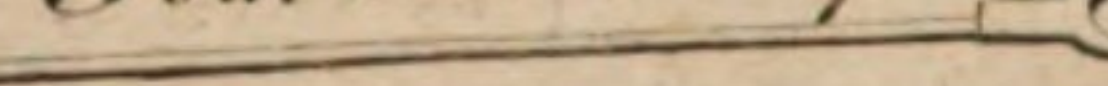
View of the Mantlet towards the Enemy.



Hook used in Saps.



Fork used in Saps.



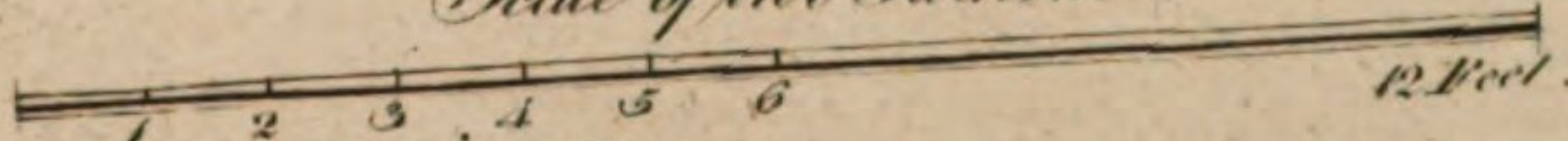
Cross-foot



Saucisson.



Scale of two Fathoms.



Part of a Line of Circumvallation.

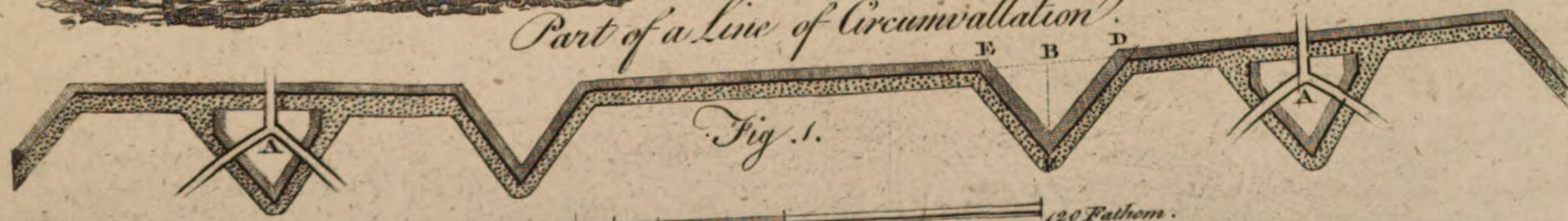
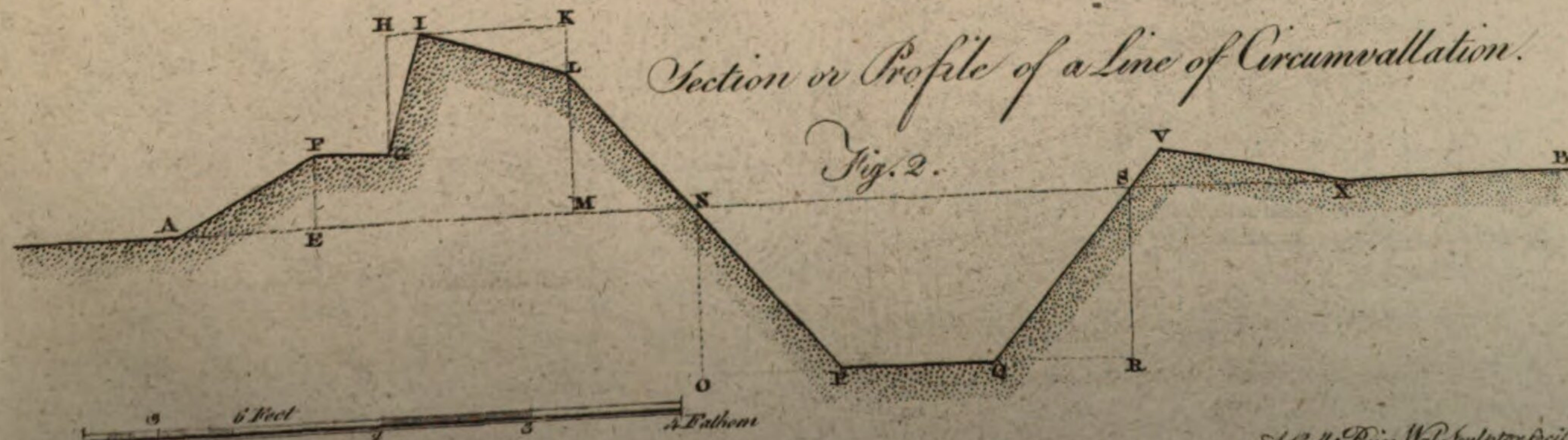


Fig. 1.



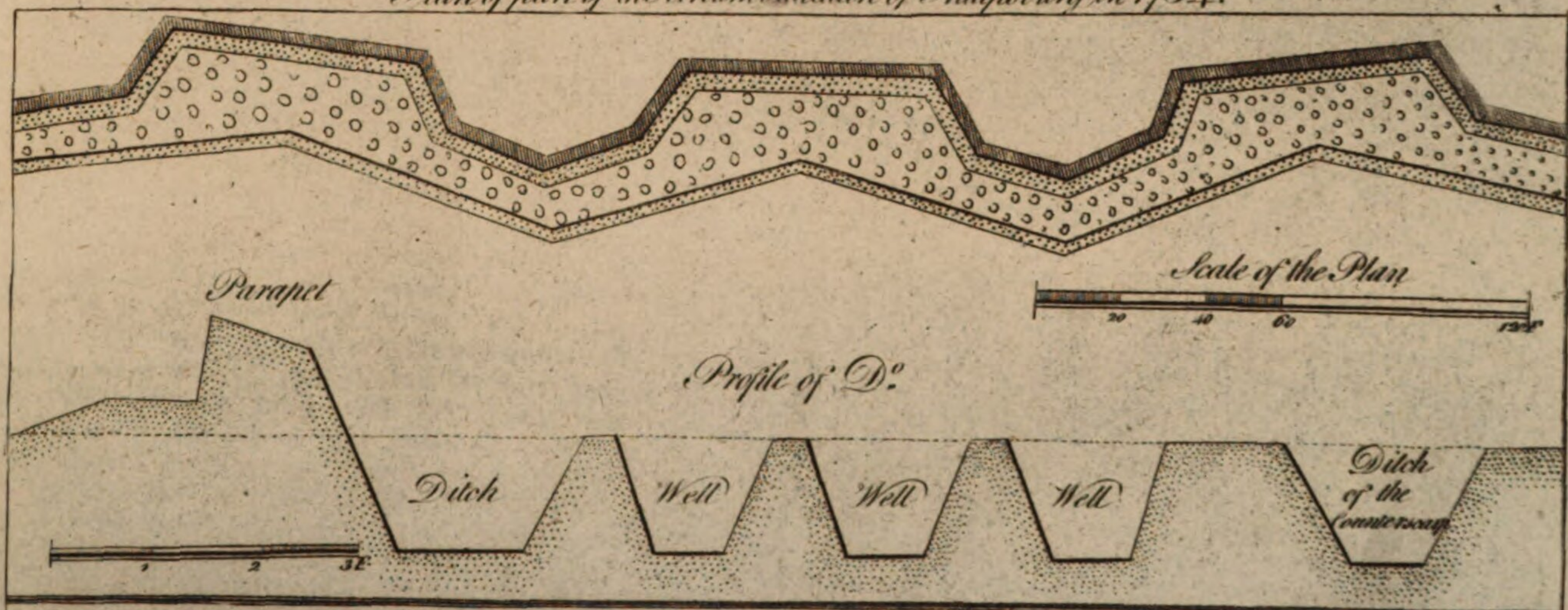
Section or Profile of a Line of Circumvallation.

Fig. 2.

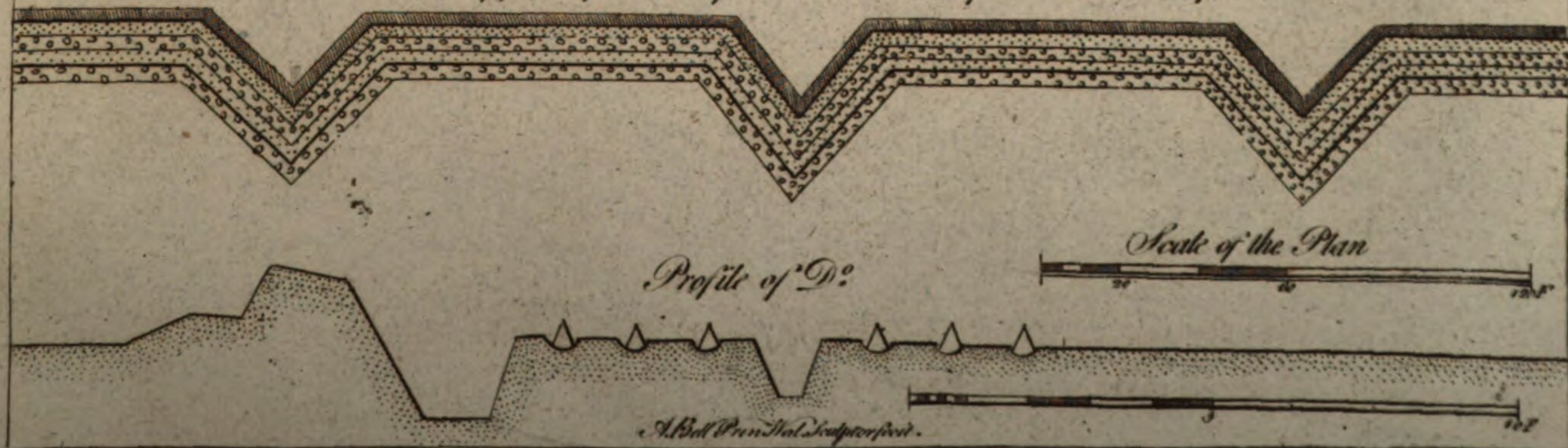




Plan of part of the circumvallation of Philippsburg in 1734.



Plan of part of a Line of circumvallation of Arras in 1634.



is, because we often see simple people, animated with the hope of gain, imagine they can easily lead a party, when they have only a great deal of good-will; but if you find in those who offer all the necessary qualities, you must immediately secure them to you as much as possible, by making them dread the destruction of their houses, and pillaging their goods, if they lead the party into a snare; you may likewise ask their wives and children as pledges of their fidelity, and, the moment of setting out, place them between the corporals of the first rank, tied with a small chain; which precaution is the more essential, as traitors have often been known, on pretence of conducting a party to seize a post, to have led them where they have had their throats cut in the middle of the night, and have disappeared at the very moment of its execution. If you make your guides hope for a recompense proportioned to their services on one side, on the other you must make them fear the cruellest punishment if they betray you.

The night being the most proper time to march to the attack of a post, you should set out soon enough to be ready to make the attack an hour or two before day. Care must be taken that it is not moon-light when you propose making the attack; the soldiers ought to march two and two, with the least noise possible, especially when passing between the enemy's sentries: you must likewise recommend to them, neither to speak, spit, nor smoke. The detachments must get as opposite as possible to the salient angles of the intrenchment, as it is probable that they will be the least defended by the enemy's musketry. If a patrol of the enemy comes while you are on your march, or ambushed in the environs, you need not be alarmed, nor make the least motion which may make the enterprise fail, but remain concealed in the profoundest silence, that the patrols may pass without perceiving any thing, and afterwards pursue your design.

If the post which you want to carry is a redoubt with a dry ditch and parapet of earth, your two first ranks must have spades and pickaxes, with their arms slung, and, on the signal being given, jump into the ditch together; because it ought to be a general maxim in attacking a post, to strike all at once. When the first rank have jumped down, the second must stop a moment, that they may not fall upon the shoulders or bayonets of the first. The two first ranks having got into the ditch, they should immediately run to sap the angles of the scarp and the parapet of the redoubt, to facilitate the mounting of the rest of the party; the leaders of each division should observe at the same time, that the soldiers who remain armed with their firelocks, and who have likewise leaped into the ditch, do not interrupt those who are demolishing the scarp of the redoubt, but protect them by presenting their bayonets to the right and left, and be ready to repulse any of the enemy that happen to be placed in the ditch.

If the parapet is fraised, they should break as many of the fraises with hatchets as is necessary to let the men pass. When the breach is made, the workers should drop their working tools; and taking their arms from the slings, mount up with fixed bayonets, and rush upon the enemy huzzaing.

When you march to attack a redoubt or such post, where the enemy have a connection with more considerable posts, the commanding officer should charge on that side, so as to cut off the communication. People who see themselves briskly attacked without hope of succour or retreat, will very soon beg for quarter.

When the scarps and parapets are of stone, they can only be carried by scaling; but you may succeed by being brisk in surrounding and sustaining the attack. An officer who

is to attack a post of this kind, should take care that his ladders are rather too long than too short, and to give them in charge only to the stoutest of the detachment. The soldiers should carry these ladders with the left arm passed through the second step, taking care to hold them upright at their sides, and very short below, that they may not dislocate their shoulders in leaping into the ditch.

The first ranks of each division provided with ladders, should set out with the rest at the signal, marching resolutely with their firelocks slung at their backs to jump into the ditch. When they are arrived, they should apply their ladders against the parapet, observing to place them towards the salient angles rather than the middle of the curtain, because the enemy have less force there. They must take care to place their ladders within a foot of each other, and not to give them too much nor too little slope, that they may not be overturned or broken with the weight of soldiers mounting upon them.

The ladders being applied, they who have carried them, and they who come after, should mount up and rush upon the enemy sword in hand. If he who goes first happens to be overturned, the next should take care not to be drawn down by his comrade; but on the contrary, help him to pass between two ladders, and immediately mount himself, so as not to give the enemy time to load his piece.

As the soldiers who mount the first may be easily tumbled over, and their fall may cause the attack to fail, it would perhaps be right to protect their breasts with the fore-parts of light cuirasses; because if they can penetrate, the rest may easily follow.

The success of an attack by scaling is infallible, if they mount the four sides at once, and take care to shower a number of grenades among the enemy, especially when supported by some grenadiers and picquets, who share the attention and fire of the enemy.

During the siege of Cassel, under the Count de la Lippe, in the campaign of 1762, a young engineer undertook to carry one of the outworks with a much smaller detachment than one which had been repulsed; and succeeded with ease, from the use of grenades; which is a proof that grenades ought not to be neglected, either in the attack or defence of posts.

If the ditch of a post is filled with water, and but middle-deep, that should not hinder you from jumping into the ditch to attack, in the manner that has been mentioned; but if there is a greater quantity, and you cannot pass, the soldiers of each platoon should carry fascines, or faggots of small branches well bound, and made as large as possible, to fill up the ditch, and make a kind of ford, so as to get at the parapet, either to demolish or scale it.

Many ways of filling up the ditch, recommended by different authors, might be mentioned; but the fascines are preferable to them all, as the soldiers can easily carry them before them, and march quicker, and make use of them as a defence against musketry, and, reaching them from hand to hand, soon make a ford.

If the approaches of the post are defended by chevaux-de-frise, the first and second rank of each platoon must break them down with hatchets; or with iron grapplings tied to ropes, they may pull them to them, and separate them. If it is a breast-work of felled trees, you must have fascines thrown against the points, or upon the branches, upon which the soldiers can easily pass. If there are two or three rows, you may burn them with dry fascines lighted at one end, and thrown in the middle row. In case of trying this last scheme, the soldiers must retire to a little distance after throwing the fascines, that the enemy may not see to fire at them by the light of the fire, but place themselves

elves so that they can fire upon any who may attempt to extinguish it. If there are chausse-traps, they must be swept away, by dragging a tree or two over the ground where they are scattered.

In the attack of detached buildings, you must seize the approaches, and strive to scale them; to get on the top, and crush the people who are below, with the tiles or slates; but if the enemy has uncovered the house, you must throw as many grenades as you can in at the windows and doors; or dry fascines, with lighted faggots dipped in rosin; or fire-balls, to endeavour to set fire to them, and smoke them out. If the weather is windy, you should profit by it to set fire to the house, and try to shut up the loop-holes which the enemy have pierced near the ground, with bags of earth, so as to sap the corners. If you have some cannon, you may shorten the ceremony, by planting them against the angles of the post. If you have none, you may successfully suspend a large beam by a rope, to three bars placed in a triangle, in imitation of the Roman battering ram: this beam pushed violently against the walls, will soon make a breach; but you must observe, in suspending it, to do it in a dark night, so that the enemy cannot prevent it by firing at the soldiers who are employed in the work. If it is glorious to get out with honour on such an attack, it is no less so to make it so as to cost but few people. The blood of the soldiers is precious, and cannot be too much prized, and an able chief will neglect no means that can contribute to their preservation. The comparing of two examples will show the importance of what is advanced.

During the two sieges of Barcelona, by Monsieur de Vendome in 1697, and Monsieur de Berwick in 1713, the first of these generals caused the convent of Capuchins, situated out of the place, to be attacked sword in hand by several detachments of infantry, and carried it in three hours, with the loss of 1700 men. Marshal Berwick caused the same convent to be attacked in the year 1713. They were equally intrenched, and reckoning to make him pay as dear as Monsieur de Vendome had done; but this general having opened a sort of trench before the convent, they not expecting to be attacked in form, surrendered at discretion, after having held it 24 hours. The reader is left to judge which example to follow.

You should prepare for the attack of a village, or such like post of large extent, as has been directed in the section for detached posts: but as these sort of attacks are always more difficult than others, on account of the multiplicity of schemes they have to encounter at every step, an officer should not march there till he is acquainted with the strength of the intrenchments; the situation of the smaller posts; the obstacles to be met with in every street or square; and even what terms the inhabitants are on with the soldiers of the garrison.

While the assailants have penetrated into the village, the commanders of each division ought to take care to leave small detachments at all the churches and squares they find; to stand firm and sustain the main body in case they are repulsed. You must watch very carefully that the soldiers do not withdraw to pillage the houses of the inhabitants, as whole detachments have been driven from towns and villages where they had penetrated, from having neglected this precaution.

Three days after the surprise of Cremona in 1702, some Germans were found in the cellars, where they had got drunk, and were astonished when they were told that they must quit these agreeable retreats. An officer who would shun a disorder so fatal, should forbid his soldiers to stir from their party on pain of death; and by placing a ser-

jeant in the rear of each division, take care that no one falls behind.

If you find cavalry drawn up in the squares or open places, the assailants should remain firm at the entrance of the streets that meet there, while some go up to the houses that are at the corners, and fire upon them from the windows; if this causes any disorder among them, they should be charged with fixed bayonets to make them surrender. If the interior part of the village is defended with cannon, you should march quickly to the place where they are, and take them, or nail them up, or turn them against the enemy or principal post of the village.

Polybius, in his seventh book, gives an account of an attack full of instruction for military men. The blockade of Sardis by Antiochus the Great, had lasted two years, when Lagoras of Crete, a man of extensive knowledge in war, put an end to it in the following manner. He considered that the strongest places are often taken with the greatest ease, from the negligence of the besieged, who, trusting to the natural or artificial fortifications of their town, are at no pains to guard it. He knew likewise that towns are often taken at the strongest places, from their being persuaded that the enemy will not attempt to attack them there. Upon these considerations, though he knew that Sardis was looked on as a place that could not be taken by assault, and that hunger only could make them open their gates, yet he hoped to succeed. The greatness of the difficulties only increased his zeal to contrive a means of carrying the town.

Having perceived that a part of the wall which joined the citadel to the town was not guarded, he formed the design of surprising it at that place: he observed that this wall was built on the top of a rock which was extremely high and steep, at the foot of which, as into an abyss, the people of the town threw down the carcasses of their dead horses and other beasts of burden; at which place great numbers of vultures and other carnivorous birds assembled daily to feed; and after having filled themselves, they never failed to rest upon the top of the rock or wall, which made our Cretan imagine that this place was neglected, and without any guard upon it.

On this thought, he went to the place at night, and examined with care how he could approach it, and where he ought to place his ladders. Having found a proper place for his purpose, he acquainted the king with his discovery and design; and the king, delighted with the project, advised Lagoras to pursue it, and granted him two other officers whom he asked for, and who appeared to him to have all the necessary qualities for assisting him in his scheme.

The three having consulted together, they only waited one night, at the end of which there was no moon; which being come, they chose 15 of the stoutest and bravest men of the army to carry the ladders, to scale the walls, and run the same risk that they did. They likewise took 30 others to place in ambush in the ditch, and to assist those who scaled the wall to break down a gate into which they were to enter. The king was to make 2000 men follow them, and favour the enterprise by marching the rest of the army to the opposite side of the town. Every thing being prepared for the execution, Lagoras and his people approached softly with their ladders; and having scaled the rock, they came to the gate which was near them, and having broke it, let in the 2000 men, who cut the throats of all they met, and set fire to the houses, so that the town was pillaged and ruined in an instant.

Young officers who read this account, ought to reflect on this attack. The attention of Lagoras, who went himself

to examine the places proper for fixing the ladders; his discernment in the choice of the officers and soldiers who were to support him; and the harmony of the whole means that were employed on the occasion, afford very excellent lessons for any officer who may attempt such an attack.

SECT. VII. *Of Surprises and Stratagems for seizing Posts.*

ALL the environs that have any relation to the place the enemy occupies must be known; on what side lie the avenues, morasses, rivers, bridges, heights, woods, and all covered places that are in the neighbourhood, without which it is scarce possible to regulate approaches prudently. It is equally necessary to know nearly the number and kind of troops with which he possesses the post, that you may not attack him with insufficient force. It is likewise necessary to know if the enemy is careful or remiss in carrying on his duty. The knowledge of these circumstances contributes infinitely to form a project of surprise well, and to conduct the whole expertly.

As to the manner of surprising a post, it is impossible to establish certain rules on the subject; because, among a thousand means which chance offers, there are rarely two alike. It must, however, be observed, that there are stratagems with which it is impossible to succeed without a proper force to sustain them. A town or village, for example, where we are introduced by a secret correspondence, cannot be carried unless we be well seconded. The only means of managing the surprise of posts well, is to divide your force instantly, to seize the castle, church, church-yard, or public squares. It has been said, that troops so divided can act but weakly, and run a risk of being defeated separately. But by making as many detachments as the enemy has posts, in the dismay caused by surprise, it is easy to carry these posts before they who defend them have time to dispute them or even look round them. The enemy being likewise obliged to divide, and not knowing what side to prefer, there is almost a moral certainty, that, stupified with the noise which they hear all round, they are ready to let their arms drop out of their hands: beside, the horrors of a dark night, and the dread that cannot fail to seize a party who are surprised, represent objects much greater than what they are, so that they imagine they have to do with a whole army.

The bad success of the affair at Cremona mentioned in Sect V. makes nothing against this opinion. If instead of stopping to make prisoners, a detachment had gone directly to the citadel, which should be the way in all such actions, it would have been impossible for these brave officers who drove out the Imperialists to have made so glorious a defence.

M. de Schöwer did otherwise when he surprised Benevar in Spain in 1708, and did not fail. He learnt that the Spaniards neglected the guard of an old castle which was at the entrance of the place; and marching in the night he took it, and detached several parties to attack the town. Surprised with such a visit, they sought for safety in flight, and ran to take shelter in the citadel, but were scarcely entered when they were made prisoners. The enemy did not think of the attack being begun where they were strongest; but it is the best way, as it is to be presumed they have divided their forces to be able to defend every where.

M. Menard, in his history of Nîmes, gives an account of the surprise of that town, which merits our attention. Nicholas Calviere, called Captain St Cosme, having resolved to make himself master of this place, engaged a miller whose mill was situated within the walls, at the side of the gate,

to file the bars of a grate which shut up the entry of an aqueduct through which the water passed into the town, and to receive 100 men armed into his mill, while a considerable body of cavalry and infantry should arrive from different places to sustain the enterprise.

The day for the execution of his project being fixed for the 16th of November 1569, and proper orders given for the rendezvous of the troops, St Cosme came out of the mill with his party at three o'clock in the morning, and advancing to the guard at the gate, put them to the sword, and opening the gate let in 200 horsemen, with each a foot soldier behind him. These troops having entered the town, formed several detachments immediately: one of which went to block up the citadel; while the rest, scattering over the squares of the place, and sounding their trumpets, instantly made themselves masters of the town.

There are a number of circumstances mentioned in this surprise, which convey a great deal of useful instruction. Captain St Cosme knew how to profit by the negligence of the governor, who omitted to guard the entrance of the aqueduct: to make a proper choice of cavalry for advancing so readily with the infantry from different quarters; the justness of the orders given the troops, which brought them 15 leagues from Nîmes at the hour and place appointed for the rendezvous; the precaution with which he invested the citadel, to prevent his having to do with the garrison in the streets; his attention in dividing his troops into the different quarters of the town, and making them sound their trumpets, that the inhabitants might imagine they were very numerous.

But the active corps of the partisan, without trusting to the stratagems that others have succeeded by, must find other resources than those against which people are so prepared now-a-days; and as the surprising of the enemy is the great business of the partisan in carrying on the *Petite Guerre*, he must see what can be effected by his hardiness and activity.

The expedient which appears to be the most proper for an officer who has 400 infantry under his command, and is certain that the garrison is only 200 (for surprises should be always attempted with a double force), is to choose very bad weather; the strong winds, for example, and fogs in winter; or the storms and tempests in summer, when, after excessive heats, violent winds rise suddenly, and agitate the air.

When you have meditated such a scheme, then is the time to put a part of your infantry in covered waggons, which should be kept ready for the purpose. The whole party ought to be provided with dog-skin covers for their gunlocks and cartouch-boxes, to take off readily when there is occasion; and the rest of the infantry to be mounted behind part of the cavalry. Both parties to assemble at some place a league distant from that which you would surprise, and there to stop; when, if you see the bad weather dissipating, you must retire till another occasion. If you renew it ten times, you need not despair; a strong place deserves this trouble, and success will overpay every fatigue.

But on the contrary, if the storm forms, and the wind increases, direct your approaches in such a manner, that you may always have the wind on your back; because if you have it in your face, the enemy's sentries can look forward and discover you; and likewise if it is in your face, your horses cannot be made to advance without a great deal of trouble. These precautions being taken, you advance more quickly as the storm increases, the horses and waggons going with great speed before the wind. You need be in no uneasiness about the enemy's sentries seeing you, or hearing the noise of your march; because the severity of the weather obliges them to enter their boxes, and turn their backs to the

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the wind, to save their eyes from the dust and sharpness of the air.

At 300 paces from the place, the foot and part of the cavalry should dismount and fix their bayonets, the rest of the cavalry to remain with the waggons near some trees or houses, the waggons turned for a retreat. Divide your infantry into five detachments, and instantly run at a great rate, keeping your men as close as possible, and passing the barrier and gates, seize all the sentries and the guard without firing or making the least noise, which may be executed with an extreme quickness, to be acquired by practice. While the first detachment seizes the gate and all the sentries of its environs, the rest must run rapidly into the town. One must go quickly to seize the main guard; another to seize the governor or commanding officer; the fourth, which should be the strongest, should fly to the caserns or mens barracks, to seize their arms; the fifth to remain in the street near the gate for a corps de reserve.

Every detachment must be conducted by prisoners made at entering; and orders sent with all speed, to cause half the cavalry to advance and patrol the streets, as the infantry get forward.

As this kind of surprise can succeed only under favour of a storm, which rarely continues any time, it is evident that the march and execution must be conducted with inexpressible swiftness, and the orders be perfectly understood. It is true, that rain is inconvenient for the infantry, whose feet slip on clay-ground; but they must do their best, and frequently it is found that the roads which are most used are not therefore the most slippery.

If it happens that you are perceived in taking possession of the gate, and they take the alarm, you must quickly divide your party into two wings, mounting them on the rampart, the one to the right, the other to the left; and seizing the loaded cannon, turn them upon the town; and at the same time summon the garrison to surrender. If you happen to fail, and are obliged to retire, you do not risk much, as they will not care to molest your retreat.

There may be a reluctance in attempting such a surprise; it may appear to be hazardous and rash, and a conduct too nice not to despair of success: but Mr Jeney says that experience convinces him of the validity of the means proposed, and relates what happened to him upon two occasions, to prove that the cold east winds or storms are the most proper times for attempting surprises.

Being at the head of 30 hussars, says he, and willing to shun a storm which was gathering behind us, I pushed to get to a place which was well fortified and occupied by a numerous garrison: the wind was strong, and I passed the barriere and all the gates with my horses, which made a great noise, without any sentry either seeing or hearing; and though I called to the first guard to declare myself, no one perceived me. I crossed the whole town without seeing a soul in the street; and hurrying to an inn in the other suburbs, I went out at the gallop, and saw only the sentry at the last barriere, to whom I answered without our comprehending one another; nevertheless the rain had not begun to fall, but the wind was violent. I experienced the same during the winter, when the east wind was very proper to facilitate the surprise of a fortified town or post. On Christmas night 1757, I passed through the country of Hanover with 80 horse between two guards of the enemy without being perceived. I marched over the middle of a plain when the night was clear, with a violent east wind, which prevented any sentry from turning his head to look at me, and I went quietly to carry off horses in the rear of their army. The following night at my return, I passed two different posts of our army; the one guarded by a party

of hussars, the other by a regiment of dragoons, without being seen but by one sentry in the middle of the dragoon post, who durst not challenge, because it was no longer time, having passed the first guards.

You may likewise take the advantage of bad weather to scale all sorts of posts surrounded with walls, as towns, abbeys, castles, &c. to do which, you must approach in the dark, and seize the moment of a great squall, or when a cold east wind obliges the garrison to take shelter from the rigour of the season: then there is no one upon the ramparts, and the sentries turn their back to the wind, or remain in their boxes, while your people are warm with marching, and animated with the hopes of success. You need not be apprehensive of the enemy seeing you if you advance on the side next the wind to place your ladders, because the sentries will cover their faces, and bend down their heads to save them from cold.

The time of a thick fog is not less favourable for approaching and forcing an intrenched post. When the fog is low, the infantry should creep on all fours, the better to conceal them from the enemy's sentries. These sort of surprises are the least dangerous, you run scarcely any risk; but if you cause some false attacks, the garrison will not fail to run to arms, and sometimes make you pay dear for failing.

When you would surprise the enemy in a village, farm, monastery, or some place detached from the army, you should divide your party in two bodies, each composed of cavalry and infantry; the one to take the enemy in the rear, the other in front, taking care to cause some waggons to follow, which may carry off the wounded in case of need. You must calculate exactly the time it will take the first detachment to go round the enemy. The two commanders should agree on a word for rallying, and the time of making the attack, which should be in the night, especially if the post is so distant from the army that they can receive no assistance; for in that case the time is favourable till day-break. They must regulate their departure according to the distance they have to go; and the detachment which goes round the enemy, ought to take no more infantry than can be carried behind the horsemen. This detachment having got round, should form about a quarter of a league from the post, and 100 paces out of the road.

When the other detachment has arrived within a quarter of a league of the post, your cavalry should form out of the road with the waggons and drums near them, who are not to advance till ten minutes after the departure of the infantry, who must advance towards the fires of the enemy, stooping as much as possible. They must take care to conceal themselves from patrols, as has been directed; and when they see them passed or entered the post, the infantry must hurry on to gain the village, and clear the entry by which the cavalry must pass, in case it has been barricaded with waggons. You must run rapidly to the place where you see the fires lighted, and make as many detachments as you see fires, in order to surprise the whole at once.

The cavalry who followed slowly, must instantly join to the noise of your arms and cries their trumpets and drums, advancing with all speed, and leaving only a non-commissioned officer with some horsemen near the waggons. The detachment, which is advanced on the other side of the village to turn the enemy, on hearing the alarm, must immediately advance, sounding trumpets, beating drums, and attacking all who would save themselves on that side. You may rely on it as certain, that the enemy, seeing all his guards surrounded by your infantry scattered in the village, and hearing the march of different bodies of foot and horse who arrive on all sides, will not delay to surrender, or seek to save himself by a disorderly flight: it will be easy then for

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for your cavalry to fall upon the flying, and stop them. The party should be forbid to pursue the enemy more than a quarter of a league in the night; but no pursuit at all should be attempted, if it is in an inclosed country. The post being taken, the booty and prisoners should be sent off immediately under the care of the infantry, putting the wounded in waggons, or on the horses that are taken, the cavalry making both the front and rear-guard, and taking care to have the last the strongest.

There is no time more precious for a partisan, or that merits so much attention, as that of a battle, when every one is attentive to the great firing which they hear on all sides; to the manœuvres of the armies that are engaging; to the decision of an affair of the greatest importance, upon which the fate of each depends. It is then that he can employ his skill to the greatest advantage; strike the severest blow that is possible; cause the ruin of the enemy; pillage the quarters of their generals; carry off their equipages; defeat their guards; set fire to their camp, and spread an alarm over all, which may contribute to the defeat of an army.

But measures must be taken to execute so great, so brilliant a project with success; and it should not be engaged in, till after having prudently regulated the design on three principal circumstances, viz. the situation of the enemy's camp; the means of approaching it; and the hour of engaging. When the enemy's camp is in the middle of a great plain, or on a height with an extensive view on all sides, it is certain that one cannot approach without being seen at a distance: and in that case, prudence will put a stop to zeal, and prevent rashness from attempting impossibilities; but when their position extends over a country covered with mountains, woods, or villages, the occasion is more favourable, and may almost ensure success.

It is then very advantageous for a partisan to be perfectly acquainted with the situation of places that are in front of his army; especially when he foresees that the enemy will sooner or later come to encamp there. What assistance would it not give for the direction of his project, if he knew how to take a plan of that part of the country which he proposes to invade beforehand? Then, without the weak and dangerous assistance of spies and deserters, he can by his own proper knowledge think of every means for executing a design, which ought to be regulated and conducted with impenetrable secrecy.

When he perceives by the motions of the armies that they are on the eve of an action, he must not delay to acquaint the general with his project. If he consents, he will regulate the rest, and the time of departure, according to the advices which he receives.

As these sort of expeditions cannot be made but by long circuits, they must take the time necessary for the march. In the campaign of 1757, the duke of Richelieu caused his army to advance near Zell to attack our army; and sent a partisan with 100 horse to the rear of the camp the day before, who, having made a march of 22 leagues, arrived without any accident: but the prudence of the prince of Brunswick defeated his design, and left him to admire his retreat; nevertheless, they picked up some stragglers, horses, and waggons.

Among the measures that ought to be taken to secure the blow, and strike it more effectually, it should not be forgot to distribute cockades like the enemy's to all the cavalry; and to give a stick of six feet long to 20 of each detachment, with a bit of torch fixed on the end, and covered with a little dry straw or hemp, to kindle instantly.

The whole party to set out from the camp A (fig. 1.), marching under the conduct of a good guide by covered

ways, at a distance from the enemy. Being come to the place C, which ought to be in the environs, and as high as the field of battle, the infantry should be concealed out of the road far from the sight of passengers. This must be the centre of correspondence with the army; the rendezvous of the booty; and support the retreat of all the cavalry, of which there should be as many detachments formed as you purpose to make attacks. We shall suppose six of a hundred men each, and they must go secretly by particular routes to their respective post E, D, F, G, H, I. Neither trouble nor expence should be spared to procure good guides. Each detachment should lie in ambush half a league, if necessary, from the object of the attack, BKKKK.

The noise of the musketry of the armies to be the signal for their irruption; and then bravery, intrepidity, and courage, will give wings to your people. The second detachment D will glance imperceptibly between the villages, and fall like thunder upon the camp B; and while 80 attack all whom they meet, the other 20 should light their torches at the fires that are to be found everywhere, and spread the flames rapidly to the straw of the tents. As they cannot fail to have the picquet of the camp soon at their heels, they must strike their blow with all possible quickness without stopping to plunder; being content with the glory of having excited a general alarm, capable of confounding the whole army, and contributing to the gaining of a battle.

At the same time that the detachment D attacks the camp B, the others E, F, G, H, must with equal violence attack the villages K, K, K, K, which they have in front, doing the same the first did in camp, except that they may plunder every thing which they can easily carry off of the generals equipages, with which these villages are commonly filled; seizing the best horses, hamstringing others with the stroke of a sword, and setting fire to all the places which contain the enemy's baggage. Each detachment should cause some horsemen to advance beyond the village, to observe the motion of the troops that will not fail to run to their assistance. As soon as they perceive them, they must make their retreat as fast as possible by the routes which the commanding officer has premeditated, and which are proposed to be represented by the coarser hatched lines. The sixth detachment I, in ambush on the side of the road leading from the camp, should remain there, to seize all the enemy who think of saving themselves by flight.

There is no danger to be apprehended in these expeditions, during the critical instant while the armies are engaged, and all the troops a great way in the front of the camp: you meet none but sutlers, servants, lame people, and some picquet guards scattered here and there, whom you may easily defeat as they advance. The commanding officer ought to have an eye over all; and as soon as he perceives some bodies of troops advancing upon him, he ought to retreat quickly, and at least gain the entrance of the wood in the neighbourhood of the enemy's camp; for without some such shelter enterprises like this can hardly be attempted.

Each detachment having rejoined the infantry, must there wait the fate of the battle; so that if it is decided in favour of their army, they may speedily regain the properest places for harassing the enemy on his retreat. These moments are the more favourable, as disorder, dread, and noise, render all defence impracticable. But all these sort of surprises require places proper to cover approaches and retreats.

The great importance of skill in the language of the enemy is apparent from the following exploit of the prince (now reigning duke) of Brunswick in the campaign of 1760. That excellent partisan was situated at some distance from

Zerenberg, at that time in the possession of the French; and being informed by two Hanoverian officers, who had been in the town disguised like peasants, that the garrison were very remiss in their duty, trusting to the vicinity of their army, and the distance of ours, the prince was resolved to surprise them; and after appointing a corps to sustain him, he advanced in the night with Major Maclean of the 88th regiment; and 200 Highlanders, with bayonets fixed and their arms not loaded, followed at a little distance. Upon the first sentry's challenging, the prince answered in French, and the sentry seeing but two persons advancing (whom he believed to be French), he had no distrust; so that the major getting up to him, stabbed him, and prevented his giving the alarm. The Highlanders immediately rushing in, attacked the guard with their bayonets, and carried the town, having killed or taken the whole garrison of 800 men.

The French officer who commanded at that time in Zerenberg concerted a scheme for being amply revenged, which failed only by a most trivial accident. When almost every house in Bremen was filled with corn, being the grand magazine and grand hospital of our army, this officer held a secret correspondence in the town, which informed him of the state of the garrison, and that there was a general order to let couriers going to the army pass out at all hours. He dispatched about 20 hussars to scamper over the country, who were all that were heard of his party, while he marched 15,000 infantry from Duffeldorp to Bremen (about 200 miles), concealing them in woods by day, and marching in the night. He arrived at the gate at the appointed hour; when a person on horseback blowing a horn came along the street, and desired to pass out to the army. The officer of the guard had the keys, and happened to be out of the way; and while a messenger went for him, the people without growing impatient, began to break down the outer barrier, which made the sentry fire at the place where he heard the noise; and the guard taking the alarm, got upon the rampart, and likewise fired at the same place: upon which the pretended courier galloped back; and the French, believing that they were discovered, relinquished their scheme, and retired.

This example proves that no distance is a security from surprises, and that very considerable parties may pass over a great extent of country without being discovered. The following instance of that presence of mind so much the happiness of all who possess it, and more particularly of a military man so exposed to surprises, deserves to be recorded.

In the month of February 1761, when Prince Ferdinand beat up the quarters of the French, they were obliged to retire a great way without being able to resist: However, when they came to collect their force, and to recoil upon our army, Sir William Erskine with the 15th regiment of light dragoons was in a village in our front. In a very foggy morning, soon after the patrols reported that all was well, Sir William was alarmed by his vedettes having seen a great body of cavalry coming to surprise him. He instantly mounted his horse, and sallied out at the head of the picquet of 50 men, leaving orders for the regiment to follow as fast as they could mount, without beating a drum or making any noise. He attacked their advance-guard in the cursory manner of the light cavalry, and continued to do so, while his men were joining him by tens and twenties, and the French cavalry forming to resist an attack, till he collected the whole, and then retired, the surgeon of the regiment (Mr Elliot) having in the mean time carried off the baggage.

Strokes of this kind display a superiority of genius, and to that alone was the preservation of the regiment owing.

Had a drum beat to arms, the enemy must have known that they were unprepared, and probably would have rushed in and destroyed them; but the attack convinced them that they were discovered, and made them think only of their own preservation.

Among many instances in the course of the war, the success of this officer on another occasion, where he displayed the most singular address, likewise merits our attention. After a repulse, and a march of 72 miles in one day, when the men were fatigued and scarcely a horse able to trot, he saw a regiment of French infantry drawn up with a morals in their rear. He left his own corps, and advancing to the French, desired to speak with the commanding officer, whom he entreated to surrender to prevent their being cut to pieces by a large body of cavalry that were advancing. The French officer desired leave to consult with his officers, which having done, they refused to submit; but upon Sir William telling them that their blood must be on their own heads, and turning to move off to his own corps, they called to him, and laying down their arms surrendered to his harassed troops.

Such stratagems overleap the bounds of instruction, and no author will presume to propose them for imitation. Here was the reaching out the hand to fortune which Vegetius recommends: but there are few who have the requisite talents from nature; and we may as properly say of the soldier as of the poet, *nascitur non fit*.

SECT. VIII. *Of Ambuscades from the Partisan.*

AN ambuscade may be formed in any place covered by art or nature in which a party may be concealed to surprise the enemy in passing; and the proper use of them is, of all the stratagems in war, the best calculated to display the genius, skill, spirit, and address of a partisan. They are easily carried into execution in woods, buildings, and hollow places; but require a more fertile imagination, and greater trouble, in a level country. Both ought to be regulated by the knowledge of the enemy's march, and the extraordinary means that may be employed to surprise them.

When a partisan has information that can be depended on of the march of some part of the enemy; whether a convoy of artillery, baggage, or provisions; a body of recruits, or horses to remount the cavalry; an escort of a general officer going to rejoin, or reconnoitre some country; he ought to apply directly to procure a sufficient knowledge of the route that the enemy is to take, the situation of the places he is to pass, and of the post he goes to. The better to cover his design, he must get information of the roads that lead to opposite places, which he must pretend to be attentive about, as has been mentioned in the section of Reconnoitring.

Having perfectly concerted his plan, he should set out at the head of his detachment if possible, and leaving his post on the side opposite to his true route, the better to conceal his design. If the place where he intends to plant his ambuscade is not distant, he should come into his true route about half way, and there place half his infantry in ambush to favour his retreat. But when the country where he proposes going is distant, and the march requires at least two nights, he must conduct his party by meandering from wood to wood, if there are any. He must not forget to provide necessary refreshments for the day, which must be passed in some concealed place where he may not be perceived, and must cause three rations of oats to be carried for each horse.

The first night you must make to some wood or other place proper for passing the day near some rivulet, and, if possible, on the road of your retreat to leave a part of your infantry

Petite
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infantry in ambush, in case there is no other water to pass till you come to the place of your principal ambuscade; for when there is still a river or canal to pass, you must conduct the infantry to the passage, and choose the most convenient place to fix them in ambuscade.

If there is no bridge or ford, the cavalry must swim over, in which we suppose the horses are practised. When there is a ford, half the infantry should pass behind the cavalry, to go along with them. In case there is a bridge to pass near the village, the officer who is left in this post with some infantry, should be enjoined to allow no one peasant or soldier to leave the place; and for greater security, a small detachment of cavalry should remain with him, to stop any who may attempt to run away before the return of the whole corps, who ought not to delay long. If the enemy come in the interval to attack the bridge, it must be defended till the return of the party, that their retreat may not be cut off.

Every precaution being thus taken to guard the bridge, the commanding officer should be diligent to arrive at the place of ambuscade two hours before the enemy is to pass, and place the ambuscade on the side he would retire to; never on the other side, if possible, lest the advanced guard happen to discover you, and oblige you to repass in sight of the corps, who, seeing your strength, may rush upon you and drive you back.

Plate
DXXVI.

The infantry A (fig. 2.) ought to be ambushed at least 600 paces behind the cavalry B, so that if they are pursued, they can fall back to A, and both afterwards to the guard at the bridge, or to the infantry that are in ambush at half way.

If the ambuscade is placed in a wood, an intelligent non-commissioned officer should be chosen to get upon a high tree C, from whence he can see the march of the enemy, and give notice of the most essential circumstances. There are three: the first is, the seeing the advanced guard; the second is, the approach of the corps; and the third is, the time when their front is advanced as far as the ambuscade B: for which the commanding officer should instruct the observer what signals he is to make from the top of the tree, to communicate the necessary information without speaking, which may be done by the means of a small cord D, of a brown or green colour, so as to be least perceivable. Let this cord be placed as in the plan, so that no branch interrupt it, with one end in the hand of the observer, and the other in the commanding officer's in the ambuscade B.

As soon as the advanced guard appears, the observer must pull the cord, and the commanding officer cause the party to mount and remain in deep silence. If by a stratagem, which is frequently practised for particular reasons, the advanced guard is immediately followed by the corps, which may easily be known by their being more numerous than ordinary, and not followed by any other corps, that you may not be deceived by the enemy, the cord should be drawn a second time, and a third time when their front is advanced as high as the ambuscade; upon which you must rush out, and pour furiously upon the flank of their centre in the following manner.

If the advanced guard E is formed only of an ordinary number, they should be let pass; and at the approach of the principal party or convoy F, the chief to be informed by the second pulling of the cord. At the moment the head of the convoy shall be advanced as high as B, the cord must be pulled the third and last time; at which signal the whole party must rush out without being perceived, and suddenly attack the centre upon the flank, engaging only with their swords, and making such a noise as to prevent

the enemy from hearing the orders of their officers. They must disarm all whom their bravery or chance throws in their way, taking care not to scatter or pursue too far, unless you are sure that they are so far from their army or other parties that they cannot be assisted; for in either of these cases, they will not fail to run at the noise, and disturb your retreat.

In all secret expeditions you ought to be extremely circumspect that you may not be seen or betrayed. If the advanced guard discovers you before the blow is struck, abandon the enterprise immediately, and retire. When your guide, or some one of your party deserts, and you cannot catch him, think immediately of retreating, or placing your ambuscade somewhere else; therefore, to prevent such a misfortune, the officers should be charged to examine frequently if they have all their people.

You should never form an ambuscade for cutting off the enemy's retreat, as this manœuvre will give him an idea of rallying, and attacking you in despair; but the case is different when you are well informed that you run no risk in stopping his whole force, either from the nature of the defile where they cannot form, or from the smallness of the number which cannot resist.

It is equally difficult and dangerous to form several ambuscades at once: the greater number that are formed, the more they are exposed to be discovered, and less in a state to unite for a retreat. To this rule, however, there is one exception. When ambuscades are formed to seize foragers, it is very proper to have several, and to dispose them in such a manner that the sentries can see from one to another. These dispositions being made, they who chance to be next the foragers must strike the blow, while the others march to secure the retreat of their companions, as soon as they perceive it.

In all ambuscades, no sentries should be placed but officers, or non-commissioned officers. On downs, behind mountains, or in gullies, the sentries should lie with their bellies on the ground, and their feet towards the ambuscade, the body covered with a grey or green cloak, according to the colour of the ground, with their heads a little raised, and wrapped in a handkerchief of a straw-green colour, or white in time of snow, so as not to be perceived. The number of sentries cannot be determined; but should be disposed so as to watch on all sides of the ambuscade, and stop every one who from ignorance approaches too near. The sentries should give notice of what they discover by gestures, to which all the officers should be very attentive.

In countries where there are no woods, vineyards, or hedges, you may place an ambuscade in a field of hemp or corn, or some sort of grain, provided it be high enough to cover you, at least with the help of art. When the stalk of the corn, &c. is not high enough, you must get some of the infantry to work with spades and pick axes, which they must have brought along with them.

The commanding officer must mark out the ground A (fig. 1.) which they are to prepare for an ambuscade, entering at the side B, and raising in the front and at the two flanks a kind of parapet C, made with an insensible slope outwards, covered with corn raised from the surface of the ambuscade in form of square turfs of a foot thick D. They should be ranged and placed one against the other till they have gained six feet and a half. If the grain is not more than three feet high, it is plain, that forming the slope imperceptibly to a foot and a half high, with the earth dug of the same depth, the grain which borders the ambuscade will be six feet and a half from the bottom, reckoning the thickness of the turf, which serves to show that such a work ought not to be declined in arable ground

Plate
DXXVII.

so easily worked. When the soldiers have finished the work, a subaltern officer must lead them back to the place destined for the infantry.

The ambushade being thus made at 100 paces from the road where the enemy are to pass, they should lead the horses into it one after another by the bridle, so as not to enlarge the entry: the horsemen to range themselves standing, and holding the bridles in their hands, with the reins slackened on the horses necks. The officers should be continually employed in visiting the party, and waking those who sleep; and be equally careful to deface all traces of the entry, that none may appear near the ambushade.

Plate
DXXVI.

Ambuscades may be placed advantageously in hollow roads when they open obliquely behind that of the enemy, as the road K (fig. 2.) which enters by an acute angle upon the route F of the enemy; nor is there greater difficulty in concealing themselves in the gullies of some rivulet G, when the borders are of a sufficient height, or have shrubs that run parallel with the road of the enemy. It is extremely dangerous to fix there when the road of the enemy approaches towards, or crosses too near, the ambushade, as they cannot fail to discover it.

As these gullies are not very large, it is necessary to have a number of ways to rush out quickly on the enemy: We suppose four, H, H, H, H, by which the cavalry can dart out suddenly upon the enemy at F.

It will be proper, before the placing the party, to cause the rivulet to be cut somewhat higher, to give it a new course I, so that the horses feet may be dry in the gullies, and make less noise; and the shorter way they have to go, they will more certainly succeed. The commanding officer will not fail to dispose them in such manner, that the whole can rush out at once by the four passages, and pour in great numbers upon the flank of the enemy.

In such sort of ambushades, the commanding officer should himself be the sentry, leaning upon the edge, and covering himself, so that he may see every thing without being perceived.

Plate
DXXVII.

In deserted villages they may fix an ambushade in the gardens G (fig. 1.), or in the barns H. The doors fronting the enemy must be shut up, and the passages which are marked by small dots made use of; for it is a general rule in all ambushades, to sally forth in such manner as to take the enemy obliquely behind their front.

You ought never to employ infantry in the ambushades we have been describing, where the cavalry act, unless to favour their retreat: but when you go at hazard, seeking to draw the enemy into an ambushade, then the infantry should have their turn. Neither woods, villages, nor any places which are much covered, are proper for them; however unskilled an enemy may be, he will not follow a party on the skirts of a forest, or in the neighbourhood of some covered place: for which reason, there are no places fitter for succeeding with ambushades of infantry, than heaths, hilly countries, hollow roads, corn-fields, ditches at the side of great causeways; provided always that you do not plant them on roads that lead to your army, for then the enemy will take care how he pursues you too far.

When you would place an ambushade on a heath, or in a country full of little hills, your infantry must lie down with their bellies on the ground. If there is some water near them, it may suggest to them to wet their clothes and cover them with dust, to give them the colour of the ground: but that this party so laid on the ground may not be crushed or trod upon by the enemy's horse when hurried along with violence, they must preserve the flank of the ambushade I, next the enemy, with a bar K, which may be made in a hurry with some stakes drove in the

ground, at ten feet from one another, and above five or six feet high, held together by cross pieces tied above five feet from the ground, which can be easily done in the neighbourhood of a wood. The time for the infantry to fire is, when the enemy's cavalry L, passing before the front, stretch their flank the whole length of the ambushade; then your cavalry M must quickly face about and attack the enemy. Their defeat will be so much the more certain, as the fire of your infantry happens to have driven their squadrons into confusion.

To ambush in the ditch of a great causeway, you must choose the deepest place, and at the edge of a corn-field which is pretty high, and there place your people sitting or kneeling. You should collect as many small round bushes as possible, which are to be found in plenty in the country, which should be planted, as if naturally, along the side of the road in front of your party, and beyond the ambushade on the side you expect the enemy, and here and there so open, that the enemy being accustomed to them may pass without distrust. You should then make the corn lean over to cover the ambushade; but if there is none near enough the ditch, you must have as many squares cut in the manner directed above as will cover the edge of the ditch. Some of the corn so transplanted should be beat down, but to appear as if done by hail or wind.

Mr Jeney ambushed in this manner with 50 men, when under the command of Captain Palasti, who advanced with his cavalry upon the causeway leading to Strasbourg; and as soon as he was perceived, 400 Bavarian dragoons advanced to attack him: he wheeled about, and the dragoons believing themselves masters of the booty, did not fail to pursue, and arrived before the ambushade without suspecting. Mr Jeney let their front pass, and fired such a deadly fire upon their centre, that he brought to the ground 17 killed or wounded: at the same time, the cavalry who pretended to fly, faced about and attacked the enemy, and would have completed their defeat, if it had not been for the great support of cavalry and infantry hurrying out of Strasbourg to sustain the dragoons; nevertheless, he carried off more than 50 horses.

An officer having placed his infantry in ambushade, ought to send on the cavalry at day-break, a non-commissioned officer with six of the best mounted horsemen making the advanced guard: they should advance as far before the party as the commanding officer can see. At sight of the enemy, they should begin to retire slowly without flying, at least till the enemy comes to pursue with keenness: in that case, the advanced guard makes the rear-guard, and may drop a few shot at the enemy, to harass them and draw them on, or make pretended delays to excite them to pursue, till they fall by degrees into the ambushade.

When you cannot place your infantry in ambush without having a village between them and the enemy, the cavalry should not be sent beyond the village, because the enemy will never expose themselves to cross it in following your party, for fear of falling into some snare: but instead of going beyond it, your cavalry should enter the village, and demand refreshment for 50 men, if the party are 100; then make three or four peasants carry orders to the magistrates of the villages that are towards the enemy, to come to you, and regulate the delivery of waggon and forage, or some other pretence. As the peasants will not fail to acquaint the enemy, and to describe your strength and situation according to what they have heard, the enemy will certainly come with superior force; and that they may come more speedily, they will bring no infantry.

As soon as the peasants are gone, you must be careful to let

let none of the inhabitants leave the place, and send continually some strong patrols to the rear on the road of your retreat, and especially to the passages by which they can cut off your communication with the ambuscade. Every horseman holding his horse by the bridle must be ready to mount, so that upon the enemy's appearing you may retire quickly from the village, and fall back one after another upon your ambuscade.

When a partisan has no infantry, he may form an ambuscade with cavalry, which should be as near as possible to the enemy. In the night, he should send out two or three waggon covered with white linen, that they may be seen at a distance: care must be taken that the harness be in good order, so that no troublesome accident happen by the want of attention to it. Each carriage to have four horses mounted by two dragoons disguised like waggoners, with their arms in the hands of two or four comrades concealed in each waggon, so that they may repulse any patrol they chance to fall in with.

The waggon should go slowly on some road parallel to the front of the enemy, and passing at some distance from their post (for it is not necessary that they pass through them), and regulate their march so, that they may be within half a league of the ambuscade at day-break, and readily perceived by the enemy; then let them stop while one mounts a tree or some height to see round them. When they perceive the patrol of the enemy, they must move off, for the others will not fail to follow; but if the enemy appears not to be inclined to follow, which the non-commissioned officer must attend to, and make one of the drivers stop, as if something were the matter with his waggon, which will draw them on till they fall into the ambuscade.

Among the thousand opportunities that the different marches of the enemy offer for ambuscades, there is none more proper than the retreat of an army which decamps to fall back. When a partisan happens to get information of it on the eve by good spies, he ought to set out immediately with his whole party, making such a round as has been drawn in fig. 1. leaving his infantry in ambuscade at half-way.

Plate
DXXVII.

The cavalry must be diligent to arrive at the place of ambuscade by day-break, which ought to be placed on the route that the enemy is to take, and two or three leagues in the rear of his camp.

To be more secure of his retreat, he should leave two or three detachments of cavalry between him and his infantry, at a good distance from one another; the remainder to line the road in several ranks parallel to it, and 300 or 400 paces behind one another, concealed from the view of passers by the favour of hollows, woods, or hills.

The first line being near the road, must take care of furlers, equipages, &c. which are the forerunners of an army, and the first to decamp when they are retiring. When they secure some waggon or mules, the first detachment should pass them to the second, and so on till they come to the infantry.

You must hasten to carry off what you can for a full quarter of an hour; after which you must press your retreat, expecting that the alarm will soon pass to the army, and the light troops be instantly at your heels.

SECT. X. Of the Retreat.

EVERY march in withdrawing from the enemy is called a retreat. That which is done in sight of the enemy, who pursues with a superior force, makes the present subject; and is, with reason, looked upon as the glory of the profession. It is a manœuvre the most delicate, and the properest

to display the prudence, genius, courage, and address of an officer who commands.

The success of the retreat depends upon the knowledge of the country that is to be passed over, and the goodness of the disposition that is made for the troops to defend themselves. The first offers advantages, and contributes greatly to the seizing them; the second restrains the ardour of the enemy, and keeps up the force of a party to its highest pitch. Both deserve to be studied.

1st, Every officer who commands a detachment ought to apply himself carefully to reconnoitre every step he takes, and examine perfectly every route that can conduct him from one place to another; he should observe attentively all the stratagems that can be employed for ambushing infantry, or posting cavalry; the course of rivers, their bridges and fords; the roads most covered with woods, hills, gullies, and villages; and, in a word, he should know all the advantages, as well as the dangers, that lie in his way. It will be easy for him to acquire a knowledge of all this, if he will use the method recommended in a former section. With the assistance of such a plan as is there described, he may regulate his retreat with ease, and put it in practice to advantage, profiting by every means proper for his defence, or surprising the enemy.

2dly, The dispositions that ought to be made for a party, to sustain their retreat in the face of the enemy, depend upon the number and kind of troops in both corps; for they must be varied according as they happen to be of cavalry or infantry united, or of either singly.

Every forced retreat in consequence of an unfortunate action, would be almost impracticable, if it were not premeditated before you come in presence of the enemy, or when you are obliged to fly by unknown routes. That which can be made in a fog, or in the night, is easiest, when your rear is secured, as you can slip out of sight of the enemy without any difficulty, and they will be afraid of following you for fear of being surprised in the dark: we shall only therefore speak of that which is to be made in open day, and under the fire of the enemy.

To conduct it properly, you must absolutely know the strength of the enemy; for it is shameful to be the dupe of a false alarm, and to retreat precipitately from an ill founded fear at the approach of an inferior enemy. You must therefore be convinced of his great superiority, and know what his party consists of.

If they come with a strong cavalry, united to a more numerous infantry than yours, you must immediately render their acting useless, by hurrying your infantry as quick as possible to retreat to the first place where they can lie in ambush, and serve the cavalry advantageously, if they can draw on those of the enemy, as has been said in speaking of ambuscades.

To conceal from the enemy, and favour the departure of your infantry, you should cause your cavalry to advance, and pretend as if they were going to attack the enemy A (fig. 2.), your party forming into two divisions B and C, each drawn up in two lines, the second double the first, and disposed as in the plan.

The division C is to retire first 100 or 200 paces, and then fronting the enemy divide into two wings, leaving an interval for the passage of the division B, who, in retiring, must leave a rear-guard at 50 paces, which must be divided into several parties D, to scamper about the enemy's front; and in case they appear desirous to attack you, your small parties must keep a constant fire, particularly on the sides that advance the most; and continue this manœuvre till they have joined the division C, which should immediately detach some small parties of the best mounted to serve for a rear-guard,

guard, and to harass the enemy, till the division B is drawn up 100 paces in the rear, and divided into wings, leaving an interval for the division C to pass through in its turn; and continue to manœuvre it in this manner, till you draw the enemy's cavalry under the fire of your infantry.

When the force of the enemy consists of cavalry alone, your infantry (marked in the plan by dotted right angles) should retire jointly with the cavalry, at least if the country does not expose you to be surrounded by some covered place; because in that case your infantry should go and occupy that place, and form an ambuscade.

The rest of the infantry should place themselves in the second line of each division. If the enemy approaches the first line too near, they should fall lightly back upon the two wings of the second, opening the centre quickly for the infantry to fire upon the enemy in platoons, at the same time that your cavalry detach several small parties to advance briskly to prevent the enemy's forming, who were thrown into confusion by the fire of the infantry. The division which retires will force its march, and go to a greater or less distance according to the pursuit of the enemy. The sustaining division must fall back afterwards till it has passed between the wings of the second division, who must then make the manœuvre of the first, continuing it alternately till the enemy desists from the pursuit.

To facilitate the retreat of the infantry, and gain some way on the enemy, many have been of opinion that they ought to transport them in waggons. But when the enemy is at our heels, the time is very ill employed in collecting carriages and harnessing them: those moments are too precious; and should be employed in causing the infantry to move off quickly, by which they will not be exposed to a train of waggons taken in haste, which may soon break, or be put out of order, and may stop the whole line; which not only retards the infantry, but likewise the cavalry, when they find the route they were to have taken blocked up with broken carriages.

When there happens to be a wood in your rear, you need not enter it if the enemy follows you close, and is prevented by your strength: it is better to coast along it by the route marked G, for fear of his coming round you; but if you cannot avoid crossing it, the division C should pass quickly, and at getting out face to the two flanks of the wood. The division B is to remain at the entrance of it, till they judge that the division C is sufficiently advanced, and then fall back, leaving the infantry for a rear-guard during the whole passage through the wood: at which time the whole should resume their first disposition.

In all defiles, and passages of bridges, the same manœuvre should be used as for woods: but the first division having passed, they should form facing the enemy; and the infan-

try likewise draw up on the other side, upon the edge of the river.

When the country through which you are to retire happens to be mountainous, the division which falls back should guard the heights by small detached parties, or, if possible, guard them themselves.

A body of cavalry retreating without infantry, ought to form in three lines at 200 paces behind one another; the two last extending their front, that they may appear more numerous, and draw up on the two sides out of the road. The first line being attacked, the second is to sustain it, the third to wait the retreat of the first, and to sustain the second, and continue to do so alternately.

If the enemy seem to quit the pursuit, the whole corps must resume the order of an ordinary march; with this precaution, that the rear-guard be reinforced, and the advanced guard weakened.

As to the retreat of a small detachment of cavalry, such as go to reconnoitre the enemy, to discover their march, to carry off some officer, or for some other commission, as they are not numerous enough to skirmish and retreat by rule, they have but two ways to choose; either to fly, or break through the enemy. They ought to determine for the last, when their retreat is cut off on all sides, so that they have no other way to escape but by cutting their way through the enemy sword in hand; but flight is always less hazardous when it is practicable.

If the officer is certain of the fidelity of his men, and their attachment to him; and sees that they cannot get out of sight of the enemy, but are ready to fall into their hands; he ought to try one means still, which has been known frequently to succeed. He should disperse his party by two and two, by the favour of the first covered place, where they may be at liberty to take so many different routes. It is evident that two men may wind from right to left, and escape more easily than a party of 12 or 20, who cannot move so freely.

Mr Jeney made use of such an expedient successfully in Italy, when the Spaniards having advice of his detachment having slipped to the rear of their army, they cut off his retreat on all sides. The whole party being dispersed, he took two hussars with him, and was followed so close, that every instant he thought he must be taken; however, he saved himself by crossing a marshy pond. The enemy ran to turn him, but he got so far before them, that they could not take him. He got safe to his post, and in three days the whole detachment met without the loss of a man; which will prove, that in such a situation we need not despair, and that in extreme necessity the passage of a river or morass ought not to be declined.

PART IV. OF SIEGES.

SECT. I. Of Attack.

§ 1. *Maxims or Principles to be observed in the Attack of Places.*

1. **T**HE approaches ought to be made, without being seen from the town, either directly, obliquely, or in flank.

2. No more works should be made than are necessary for approaching the place without being seen; that is, the besiegers ought to carry on their approaches the shortest way possible, consistent with being covered against the enemy's fire.

3. All the parts of the trenches should mutually support each other, and those which are farthest advanced ought not to be distant from those which are to defend them above 120 or 130 fathoms, that is, above musket shot.

4. The parallels or places of arms the most distant from the town, ought to have a greater extent than those which are nearest, that the besiegers may be able to take the enemy in flank, should they resolve to attack the nearest parallels.

5. The trench should be opened or begun as near as possible to the place, without exposing the troops too much, in order to accelerate and diminish the operations of the siege.

There

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There is no such thing as giving any exact rule in regard to the distance which ought to be observed upon opening the trenches. On level ground this distance may be 800 or 900 fathoms; but if there should be a hollow way in the neighbourhood of the place, the besiegers are to take advantage of it, and open the trenches nearer. In general, they are to regulate themselves upon this head according to the nature of the ground, more or less favourable to the opening of the trenches.—We shall suppose, in the present work, that the opening ought to be made within 800 fathoms of the covert way; the first parallel within 300 fathoms, the second within 150, and the third at the foot of the glacis.

6. Care should be taken to join the attacks; that is, they ought to have communications, to the end that they may be able to support each other.

7. Never to advance a work, unless it be well supported; and for this reason, in the interval between the second and third place of arms, the besiegers should make, on both sides of the trenches, smaller places of arms, extending 40 or 50 fathoms in length, parallel to the others, and constructed in the same manner, which will serve to lodge the soldiers in who are to protect the works designed to reach the third place of arms.

8. Observe to place the batteries of cannon in the continuations of the faces of the pieces attacked, in order to silence their fire; and to the end that the approaches being protected, may advance with greater safety and expedition.

9. For this reason the besiegers should always embrace the whole front attacked, in order to have as much space as is requisite to plant the batteries on the produced faces of the works attacked.

10. Do not begin the attack with works that lie close to one another, or with reentrant angles, which would expose the attack to the cross-fire of the enemy.

§ 2. Of Investing.

THE first operation of a siege is investing. The body of troops investing a town ought at least to be as strong again as the garrison; they are to divide themselves into several parties, in order to take possession of all the avenues leading to the place. By day they should keep themselves out of the reach of cannon-shot; but as soon as it is dusk they must approach much nearer, the better to be able to support each other.

The investing is generally made by cavalry; but when the country is cut with ravins or hollow ways, or when there are woods in the neighbourhood of the place, then there must be likewise a body of infantry to guard all the avenues, and even to stop up, by a kind of retrenchments, such as might be the easiest to penetrate.

A few days after the investing, the army arrives, and is disposed round the town, according to the ground taken up by the line of circumvallation, and assigned by the engineer who has the direction of the siege. As soon as the place is invested, they begin to trace the line of circumvallation, and afterwards they set about its construction.

§ 3. To trace out the line of Circumvallation.

BEFORE a general begins the attack of a place, he must endeavour to have as exact a plan of it as possible, by which he forms a design of the circumvallation and the attacks. The plan is rectified after the investing as much as the vicinity of the enemy will permit; and thereby he may correct the design traced at first, as far as there may be occasion for correction. It is upon such a plan, so rectified, that we suppose a general to proceed. We shall therefore begin

with explaining or tracing the operations of the siege. We shall exhibit the progress of these operations from the investing to the taking of the place, in the order they are really executed. The line of circumvallation being a fortification intended against the enemy from without, who should attempt to succour the town, its defences ought to be directed against that enemy; that is, they ought to be opposite to the town; and the besieging army should, as we have already observed, be encamped behind that line, that is, between it and the town. The camp should be, as much as possible, without the reach of cannon-shot: therefore, as the line of circumvallation should be at a greater distance from the place than the camp, the reason is still stronger for its being also out of the reach of the cannon-shot; which, whether fired horizontally, or at an angle of 10 or 12 degrees, may be reckoned about 1200 fathoms. As the rear of the camp should not be incommoded by the cannon, this part ought to be above 1200 fathoms distant from the place; and we shall suppose that the distance ought to be fixed at 1400 fathoms from the covert way. The depth of the camp may be estimated at about 30 fathoms. From the front of the line of circumvallation there should be a space of 120 fathoms, to draw up the army in battalia behind the circumvallation; which space added to 30 fathoms, supposed for the depth of the camp, gives 150 fathoms; and this added to the distance from the covert-way to the rear of the camp, gives 1550 fathoms for the distance from the circumvallation to the covert-way.

This being laid down, if the place be a regular octagon, fortified according to M. Vauban's first method*, the radius thereof will be 234 fathoms. This distance being added to the 1550 fathoms, then we shall have 1784. Or we may make it a round number by adding 16 fathoms, which are here of no manner of consequence, and we shall have 1800 fathoms for the distance from the centre of the place to the line of circumvallation.

* See Fortification.

The radius of the circumvallation being thus settled, from the centre of the place, with the distance of 1800 fathoms, you are to describe the circumference of a circle round the place. The diameter being 3600 fathoms, the circumference will then take 11,314; then take the distance of 120 fathoms, which you are to carry to the circumference above described. This distance will be in this example 93 times, and something over, which differs very little from 120 fathoms; so that you may look upon the polygon of this circumvallation as a polygon of 94 sides, of 120 fathoms each.

The polygon of the circumvallation being traced, take on each of the extremities of its sides the lines BD and BE, each of 15 fathoms; and from the points D and E, taken for the centre and distance of 25 fathoms, describe two arcs which cut one another at the point F; from whence draw the lines FD, FE, for the faces of the redans of the line of circumvallation: thus it is we form the salient parts EFD of this line, which serve to flank it. Perform the same operation on every side of the circumvallation, and then you will have its principal line traced.

Plate DXXVIII. fig. 1.

The parapet within must be six or eight feet deep; and without make a ditch parallel to all its parts, three or four fathoms in breadth. The parapet of the circumvallation will be seven feet and a half high, and the depth of the ditch equal to the height of the parapet.

To make the profile of the circumvallation, let AB fig. 2. be the line level with the country, and CD the scale of the profile. Let A be the side of the town, and B that of the country; take AE, of six feet; from the point E, raise the perpendicular EF, of three feet, and draw the line AF, which will be the talus of the banquette.

Draw

Draw *FG* parallel to *AB*, three feet from *F* to *G*, and the line *FG* will be the breadth of the banquette. On the point *G* raise the perpendicular *GH*, upon the line *FG*, four feet and a half. Draw from the point *H*, *HK*, parallel to *AB*. Make *HK* seven feet and a half, *HI* a foot and a half, draw *GI*, which will be the inside of the parapet of circumvallation.

From the point *K*, let fall on the line *AB* the perpendicular *KM*; take *KL* a foot and a half, and draw *IL*, which will be the upper part of the parapet of the line of circumvallation. Take *MN* five feet, and from the point *N* draw the perpendicular *NO*, and set off seven feet and a half from *N* to *O*. Draw *OR* parallel to *AB*, making the distance three fathoms or 18 feet from *O* to *R*; draw the line *LN* and produce it to *P*, and *LP* will be the scarp, or the outside of the parapet of the line of circumvallation. From the point *R* raise *RS*, perpendicular to *OR*, or parallel to *ON*. Make *QR* equal to *OP*, and draw *QS*, which produce beyond *S* three feet to *V*; then take *SX* six feet, and draw *VX*, and the profile of the circumvallation will be completed.

This kind of glacis, *VX*, will serve to raise the enemy, and to expose them more to the fire of the line, should they attempt to make themselves masters of it, and to cover the parapet of the circumvallation, in the same manner almost as the glacis of a place covers the top of the rampart.

The dimensions above given may vary a little without inconvenience; but it would be to no manner of use to make the lines stronger; only you may reduce the ditch to ten or twelve feet in breadth at the top, and five or six feet in depth. A ditch of less breadth and depth, besides its not allowing ground enough to form a good parapet, would have the inconvenience of being too easy to pass over by the enemy. The lines may be fraised (see *FRAISE*); which is done when they are to last for some time, and the neighbouring country furnishes wood enough for the purpose.

Sometimes a fore-ditch is dug before the lines, 12 or 15 feet in breadth at the top, and six or seven feet deep; it is made about 12 or 15 fathoms from the ditch of the line. The design of it is to stop the enemy when they attempt to attack the lines, and to make them lose both time and men in passing over it. As it is exposed to the fire of the lines, the time the enemy must necessarily spend in crossing will of course occasion their losing a great many men; and besides, the passage itself may throw them into such disorder, as shall prevent their attacking so advantageously as they would otherwise do, were it not for this obstruction. Between this fore-ditch and the ditch of circumvallation, at the siege of Philipsburg, in order to strengthen the defence of the circumvallation, there were likewise dug wells, which were ranged chequerwise, of about nine feet diameter at the mouth, and six or seven feet deep. They were situated near to each other, to prevent the enemy from passing easily through the intervening spaces. The Spaniards practised something of this kind at the siege of Arras in 1654. Before the circumvallation, they dug a number of holes two feet diameter, and a foot and a half deep; in which they fastened stakes that were capable of greatly obstructing the passage of the cavalry. See Plate *DXXIX*.

A line of circumvallation requires a strong army to defend it. We have found the circumference of the line which we have been now tracing, namely, of 94 sides, each of 120 fathoms, to be 11,280 fathoms; out of this number the gorges of the redans are to be deducted, but then their faces are to be added. The gorges have 30 fathoms; and the two faces which have 50, give an overplus of 20 fathoms on each redan; that is, to the number above mentioned of 11,280 fathoms, add as many times 20 as there are

redans, in order to have the entire circumference of the circumvallation. This circumference has 95 redans; therefore we must add 94 times 20, or 1880, which will make 13,160 fathoms for the whole circumference. This number being divided by 2282 (which is the number of fathoms contained in a French league) gives about five leagues and a half. Now it is clear, that so great an extent of ground requires a very numerous army to guard it. We may make a calculation pretty near, by supposing that every soldier drawn up in a line occupies a space of three feet, that is, half a fathom; that the soldiers are four deep; and that the army is drawn up in two lines, which will give eight ranks of soldiers. Each rank containing 26,320 soldiers, the circumference of the circumvallation being 13,160 fathoms, the eight ranks will therefore make 210,560 men.

To these we should likewise add about 12,000 or 15,000 men for the works of the attack, which would form an army of about 225,000 men. And as it is not customary, at least in Europe, to send such strong armies into the field, from thence it follows, that the circumvallations, and the lines in general, when they are of a very great extent, are extremely difficult to guard. And indeed the most celebrated generals have been divided in their opinions upon this subject. They all agree that there are certain cases in which they may be of some advantage, especially when they are of a narrower compass, and the design of them is to stop up the entrance of a country of a small extent; but if they are very large, it is extremely difficult to defend them when attacked by a skilful enemy.

It was heretofore the custom to add great outworks to the lines, such as horn and crown works, tenailles, &c. All the circumvallations of the towns that were besieged during the wars between Spain and Holland, under the princes of Orange, were remarkable for this sort of works. These have been since laid aside, because we find that even a line, with its simple redans, is very difficult to guard; and such a number of outworks does but increase its circumference. The modern lines have only a few small half-moons *A*, before the gates of the circumvallation, placed, like those of the towns, against the middle of the curtains; the entrance is shut up by wooden barriers, and sometimes by chevaux-de-frize, and other contrivances, which will hinder the passage from being easily forced. Plate DXXVIII, fig. 1.

The lines having very little elevation, stand in no need of bastions to be flanked in all their parts, like those in the circuit of a town. Redans, which are of more simple and expeditious construction, are sufficient. The angle they make with the curtain is always very obtuse, to the end that the soldier being placed on the face of the redan, may be the better able to defend its approach. It is customary indeed to make bastions in those parts where the lines form such angles as could not be sufficiently defended by redans. Yet, whenever it may be judged necessary, the line of circumvallation may be fortified with bastions. The greatest part of the lines at the siege of Philipsburg was flanked in this manner, as may be seen in Plate *DXXIX*. The bastions increase the circumference of the circumvallation; and probably the reason why they were used at the siege of Philipsburg, was because the circumvallation was of a very small extent.

At the point of the redans, batteries are erected to fire the cannon a barbette over the parapet; and the same is practised wherever the cannon are placed on the line of circumvallation.

Hitherto we have supposed that the circumvallation was regular; but even were it irregular, the construction of it would differ very little from that which we have just now given.

A general ought to possess himself of all places from which

Of sieges. which the lines may be commanded, when it is possible to do it without carrying the circumvallation to too great a distance. He should likewise take all advantages arising from the nature of the ground, as precipices, eminences, rivers, brooks, morasses, and, generally speaking, whatever is capable of rendering the camp of difficult access. If there are any woods or bushes within its inclosure, it will be right to cover it in those parts by felling the trees, and therewith making a proper fence.

The tracing of the lines is a matter of no difficulty, if you have a good map of the adjacent country; since you have only to bring the several parts of the line nearly within 1800 fathoms of the centre of the place, and to take care that there shall be about 120 fathoms from the point of one redan to another.

Nor is there any difficulty in transferring this line to the ground; the operation is too easy to those who know a little of practical geometry, to lose any time in explaining it here.

When the garrison is numerous enough to disturb the besieging army, another line is traced in the rear of the camp, called the *line of countervallation*. As it is intended to oppose a far less considerable body of troops, it is never made so strong as the line of circumvallation; but it is constructed on the very same principles, as the figure will sufficiently show.

Plate
DXXX.
fig. 1.

§ 4. Of the Park of Artillery.

THE park of artillery is the place which contains the cannon, bombs, powder, and in general all military implements and machines that have any relation to the artillery. This park should be placed where there is least danger of being insulted by the enemy. It ought to be without the reach of cannon-shot, and inclosed within a particular spot, which should be fortified also by a line, consisting of a ditch and a parapet, flanked with redans in the same manner as the circumvallation. Nothing should be neglected that is capable of securing it either from the attacks of the enemy, or from any other possible damage.

§ 5. Of the Trenches and Parallels.

WHILE the line of circumvallation is finishing, all the materials necessary for the construction of the trenches are got ready, and the engineer, who has the direction of the siege, examines on the spot the most proper place for the attacks, and the figure they ought to have; and of these he makes a particular plan.

We have supposed that the place is regularly fortified, and on level ground; so that here it is indifferent on which side the attack is begun. It is sufficient to explain the rules that are to be there observed; and afterwards to apply them to irregular towns, and to uneven grounds. Let C (fig. 2.) be the place besieged, and A and B the bastions attacked. Begin with indefinitely producing towards the field the capitals of these two bastions; in like manner produce the capital of the half-moon opposite the curtain between these two bastions; set off 800 fathoms from the salient angles D and E of the covert-way to F and G. This done, take DH, and EI of 300 fathoms; and from the centre C, with the radius CH or CI, describe an arc, which produce beyond the points H and I; and on this arc HI construct the first parallel. Then on the same lines, DF, EG, take the points M and N 140 fathoms distant from the points H and I; and through these points describe from the centre C another arc, on which the second parallel is constructed. This second arc will cut the produced capital of the half-moon in the point L, which is to be observed, in order to begin from hence a trench, which shall

Plate
DXXX.

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Of sieges. extend to the salient angle of the covert-way before this half-moon. Lastly, through the points O and P, the distance of 20 or 25 fathoms from the angles D and E, describe from the centre C a third arc, on which the third parallel is constructed.

Terminate the first parallel by producing the faces *ab*, *ab* of the half-moons 1 and 2, collateral to the bastions A and B; but extend the parallel 15 or 20 fathoms beyond the intersection of this prolongation. The second parallel will be less extended than the first, by about 30 fathoms on each side; and the third also less extended than the second, by about 30 fathoms on each side.

This being done, you have a sketch of the trenches and the places of arms. The business now is to trace the trenches, or approaches, without being seen or enfiladed.

Take a long ruler, and lay it on the point G, so that it shall make, with the produced capital EG of the bastion B, an angle EGS, whose side GS being produced, shall meet no part of the covert-way, and shall be distant about 10 or 12 fathoms from the angles to which it approaches nearest. Take GS of an arbitrary extent, as of 200 or 220 fathoms, and put the ruler on the point S, so that it shall make with GS such an angle GST, as that the side ST produced shall not fall on any part of the covert-way, but be 10 or 12 fathoms distant from the most salient parts. Terminate this side in T, and there make also a new angle STI, whose side TI should terminate at the point I, where it meets the first parallel. Perform the like operation on FH, and it will give you the outline of the trenches as far as the first parallel.

At this part of the trenches you may make a greater number of turnings; you may likewise carry it in a direct line to the first parallel. The most important article is, to take care not to let it be enfiladed from any part of the covert-way; and the fewer angles and turnings it makes, the quicker it is constructed, which in transferring it to the ground is worthy of great attention. Take care also, that its extremity, I, do not fall far from the point where the produced capital of the bastion meets the first parallel.

By the same method trace the trenches between the first and second parallel, as may be seen in the figure; but as this part is nearer the place than the former, in order to avoid being raked, it must have a greater number of angles. All its sides ought to cut the prolongment of the capital of the bastion B, as appears by the figure. In like manner trace the trenches betwixt the second and third place of arms, by making as frequent turnings on the produced capital of the bastion B, as shall be necessary, in order to its desiling from the covert-way. By the same method trace the trenches on the capital of the bastion A; trace also a trench on the produced capital of the half-moon, between the second and third parallel, to reach the flanked angle of its covert-way.

When the garrison happens to be strong and enterprising, it will be proper, between the second and third parallel, to make parts of trenches V, V, &c. parallel to the places of arms; they are to be 30 or 40 fathoms long, and to communicate with the trench, as may be seen in the figure. These parts of the parallels are what we have distinguished by the name of *half parallels* or *places of arms*. At every angle of the trenches observe to produce the part of the trenches in those places, so that this prolongation shall cover that part of the trenches which it terminates.

This will be illustrated by an example.

Let ABCDFGMQ be a part of the trenches, and let AB be one of the sides opposite to the enemy; produce AB, so that BE shall be five or six fathoms; and in FG take also five or six fathoms from I to L, which will give

Plate
DXXXI.
fig. 1.

5 E

the

Of Sieges.

the end of the trench BELI, the use of which is to cover the *boyau* or branch IOMG, whereby the enemy will not know the place where it falls into the trench AB, and to make room for withdrawing those who are in this part of the trenches, and that the passage may be free at all the angles. In like manner produce the side GM from M to N, and the side IC from O to P, and you will have the end of the trench MNOP, which will cover the branch DCOQ. Do the same at all the angles of the trench.

The parapet of the trench being made to cover it, ought to change sides alternately. If, for instance, AE, in the preceding figure, is towards the place, it is evident that the side GN will be towards it also, and likewise the side CD; and therefore the parapet of the trench is successively constructed from the right side to the left, and from the left to the right. In the plans of attacks, the side of the parapet of the trench, as also that of the parallels, are distinguished by a stronger line than any of the rest; but the latter admits of no difficulty, because we may easily conceive that, being parallel to the place, its parapet must necessarily be on the side that faces it. Care has been likewise taken to express, as we have already mentioned in the figure, the parapet of the branches, by a stronger line than the other lines of the attacks. The side of the trench opposite to the parapet is called the *reverse of the trench*.

The trenches are generally no more than three feet deep; and their parapet, beginning from the bottom of the trench, is six feet and a half high, or thereabouts. The parallels have a parapet like the trench, and of the same height; but as they are intended for firing over, they are made with a kind of banquette, as may be seen Plate DXXXI. fig. 3. to raise the soldier, to the end that he may fire over the parapet. On the parapet of the places of arms are put baskets, fascines, or sand-bags, ranged in such a manner that the troops may be able to fire without being too much seen by the enemy. The third parallel, or place of arms, is generally wider than the rest. Sometimes the inside of its parapet is likewise made with steps or banquettes, to the end that the soldiers may conveniently pass over it in case of an attack. See fig. 4.

There will never be any great difficulty in tracing the attacks, from an exact plan, by observing the method we have made use of to make its parts defile properly. But the difficulty is to transfer the works from the plan to the field; for doing which the following plan has been recommended.

In the first place, the engineer must from all the angles of the branches of the trench, upon the plan, draw perpendiculars to the produced capitals; observing the distance of each of these perpendiculars and their length. He is then to walk about the place in the day-time, at a sufficient distance to be without the reach of musket-shot. It is not usual to fire cannon against a single man, because the shot is very uncertain, especially against a person who does not stand still for any time; therefore, without any great danger, he may only keep himself out of musket-shot. It is easy to discover the flanked angle of the bastions against which he wants to direct the attacks, and the salient angle of the covert way opposite to them; which gives two points, and these the direction or the prolongation of the capitals of those bastions. Consequently he has only to plant some picquets on the direction of these points, in order to have the prolongation of the capitals of the bastions. These picquets can only be put out of the reach of musket-shot; but by day-light he may observe something of the ground lying in the direction of these picquets, and he may afterwards reconnoitre it in the evening, in order to place

picquets there also. In this manner he may have the prolongation of the capitals pretty exact.

In order to conduct the trench by these capitals, the following method has been pointed out by marshal Vauban.

Examine upon the plan of the attacks what distance there is from the beginning of the trench to the first perpendicular; measure this perpendicular and the side or part of the branch corresponding to it; take cords of equal length with these lines, and fasten the extremities of the two cords, one representing the length of the line of direction, and the other that of the branch which makes an angle with it, to a picquet at the point of the produced capital where the trench begins, and make two men walk, each of them holding one end of these cords, viz. one in a direct line towards the place, the other also advancing towards the place and walking alongside of the former. When the first comes to the farthest distance betwixt the opening of the trench and the first perpendicular, he must plant a picquet on this point, to which he is to fasten the cord which expresses the perpendicular. He must take the other end of this perpendicular, and afterwards turn off to the right or to the left, according to the side where the perpendicular ought to be, till the part of the cord expressing the perpendicular is well stretched, and joined to that end of the cord of the trench carried by the other man: at their meeting they are to plant a picquet, by means of which the triangle, thus transferred to the ground, will be like that which was taken upon the plan; and this part will be traced on the ground in the same manner as on the plan. In like manner may every part be traced in the beginning, when the trench is yet at a distance from the place.

Let the trenches be traced upon the plan (fig. 2.), and let C be the place against which you are to direct the attacks, transferring the plan to the ground: let BG be likewise equal to the line of direction of the plan; you are to plant along this line a sufficient number of picquets, with burning matches tied to them, in order to discover them the more easily. Plate DXXX.

To begin the tracing of the trenches, tie to the picquet G a cord of the length GS, and to the same picquet another cord of the length GX: let there be two men, and each take an end of these two cords, and let them walk, the one at a venture towards S, and the other directly to X towards the place along the line of direction BG; and having reached the end of his cord, let him fasten it with a picquet, after having drawn it very straight; and to this picquet let him tie one of the ends of the cord, which is to mark the perpendicular XS. Let him take the other end, and walk towards S till his cord XS is stretched very tight, and then let him join the man who holds the end of the cord GS, and let them fasten a picquet in S, where both the cords join. Let them afterwards take away the cord XS, the perpendicular which is of no use, and the cord GS which remains will mark the real tracing of the trenches. In order to have the line ST, you come to the picquet X; to which you tie a cord of the length of XY, and another to the picquet S of the length of ST. Let two men, as before, take each an end of these two cords, and let them walk, the first who holds the end of the cord XY directly towards B, and the other who holds the end of the cord ST obliquely towards T: he who holds the cord XY, having reached Y at the end of his cord, shall place a picquet there; to which let him tie the end of the cord of the perpendicular YT, and let him walk towards T, holding the end of this cord, till he meets or joins the man who holds the end of the cord ST; and at the point T of their meeting let them place a picquet, to which let them tie the end T of the cord ST,

Of Sieges. After this take away the cord of the perpendicular, and thus continue the same operation as long as you please, or are able, in order to trace all the other turnings or windings of the trenches.

This whole operation supposeth that you know exactly the distance of the point G, the extremity of the line of direction to the top E of the salient angle of the covert-way. This distance may be found by the common rules of trigonometry, or by the following simple method pointed out by marshal Vauban: Let A (fig. 5.) be the vertex of the salient angle of the covert-way, and AB the line of direction of the trench whose length you want to take. At the point B, draw BC perpendicular to AB, to which give what measure you please, as 80 or 100 fathoms, and at the point C draw CD perpendicular to BC: In CD take any point E, and in the line of direction between it and the angle A place a picquet G in the line BC. Measure GC and CE, and say, as GC : BG :: CE : AB.

Plate
DXXXI.

When once you have found out by this, or such other methods as you may make use of, the length of the line of direction EG (Plate DXXX. fig. 2.), you will be always able to know the distance that remains to the salient angle of the covert-way, and to the points I, N, P, through which the parallels or places of arms are to pass. These points being determined, it would be an easy matter from geometry to find out a method of describing the parallels that are to pass through them, if their situation admitted the engineers to perform the operation quietly by day-light; but they are to be traced in the dark, and under the fire of the place; so that there is no other way to trace them than by approximation, that is, to move as nearly parallel to the circuit of the place as you can by your judgment; and to plant picquets, with cords tied to them at proper intervals, the whole length of the line. But you can trace with cords only the first parallel; for the others are too near the place to permit you to perform this operation: you are therefore to proceed in tracing them almost in the same manner, as we shall observe when speaking of the sap, to which they belong, and which is carried on by that method.

§ 6. *Observations on the properest Part for making the Attacks.*

WHILE the lines are perfecting, the necessary materials are to be got ready for the construction and operations of the attacks. The materials consist of fascines, picquets three feet long and about an inch or two in diameter, gabions, and picquets for gabions. There must likewise be a provision of the several instruments or tools necessary for these operations.

The engineer, who has the direction of the siege, will likewise make use of this time to examine into the parts most convenient for carrying on the attacks, and where they will be most simple and expeditious. There are few fortresses in Europe of which plans are not to be had; but as it is presumed that the enemy hath increased the fortifications of a town which is threatened with a siege, care should be taken to get intelligence thereof from some skilful person that has been in the place, and made all the observations possible in regard to the works lately raised, without giving any suspicion of his intentions. The danger of such an undertaking is very well known, so that the person employed cannot be too cautious in keeping himself concealed.

While the circumvallation is making, the engineers may at a distance, or, as we have already observed, out of musket-shot, examine some part of the out-works; and afterwards, from the report of the person sent into the place, and from what they know themselves, they may settle with the general the properest and fittest place for carrying on the attacks.

Of Sieges. On this occasion there are many things to be observed, as well with regard to the ground as to the fortifications; but in a work of this nature, it is sufficient to consider the points of most importance.

First of all, the nature of the ground about the place must be well observed. Whether there are any ditches or hollow ways, that may serve as a cover to guards of horse and foot against the cannon of the place; whether there are any parts that command the town, and may serve for the erecting of batteries; and whether the ground is fit for the works. The most favourable circumstance is to find a soil easy to dig; then the works advance with ease and less loss, because the soldier is soon under cover, and the cannon does not do half the mischief as in stony places. If the ground about the place is a pure rock, or a morass, the operations are extremely difficult; and there will be occasion for a vast quantity of fascines, sand-bags, wool-packs, &c. because the workmen are in much greater danger.

The rivers which run through the town, or in the neighbourhood, likewise deserve consideration; for they separate the attacks, and it may happen by some stoppage of the water, or other accident, that the bridges of communication being broke down, the separation of the attacks will expose the army of the besiegers to be defeated, by which means the place may be relieved. It is proper also to inquire, whether those rivers are not subject to inundations, which, if they were to happen during the siege, and to break in upon the attacks, would oblige the besiegers to abandon the trenches, and to raise the siege. In a word, whether the town can command any quantity of water so as to make an inundation round the place, and to lay the ground appointed for the attacks under water. All these points, and a great many others which we do not mention, deserve the most serious attention.

After choosing the properest ground for the attacks, a general is to consider the front which is least fortified and least covered with outworks. All other things being the same, it is evident, that the fewer outworks there are, the easier will be the attack. But if the place be situated in a morass, or upon an eminence, then he must necessarily make his attack on the accessible side, be its outworks what they will. In a word, the whole choice of the attacks consists in finding out the properest ground, and the weakest side; but as it is to be presumed that the enemy are acquainted with the nature of the ground about the place, and therefore have taken care to fortify more exactly those parts which are most favourable to an attack, the besiegers should not hesitate to make their approaches on that side; where, by the situation of the ground, they may gain, what the increase of the fortifications might otherwise make them lose.

§ 7. *Of opening the Trenches.*

EVERY thing being ready for opening the trenches, the ground pitched upon, the attacks settled and drawn upon a plan, and stores or magazines of all the materials necessary on the occasion being within reach of the place where the pioneers propose to work; the general having also settled the round of duty for the guard of the trenches, both of horse and foot, as likewise the number of horse for bringing the fascines, with the number of pioneers and troops to support them; and the chief director of the engineers having acquainted the rest of the corps with his plan of attack, and the manner they are to act; in a word, every thing being ready for execution, the troops designed for the service of the first night being prepared and drawn up in battalia at the place of rendezvous, and the pioneers provided with fascines, picquets, shovels, and pick-axes;—in the dusk of the

evening they all begin to advance, every soldier being obliged to carry a fascine, together with his arms, in order to reach the place designed for opening the trenches. The guard of horse march at the same time to their assigned posts, to the right and left of the attacks, ready to support the troops for the guard of the trenches in case of any rally from the enemy. All this is to be done with the greatest silence possible, and nothing should be neglected to conceal the design from the enemy.

The pioneers are, according to marshal Vauban, divided into brigades of 50 men each, commanded by a captain, a lieutenant, and two serjeants. They advance four or six abreast, near the place where the trenches are to be opened; after which the rest of the troops that are to support them, being come up, the engineers charged with the tracing of the trenches, and who are to place the pioneers, make them come forward where the opening is to commence, while the battalions that support them are drawn up to the right and left in the places assigned them, where they unload their fascines, and silently wait for further orders. In the meanwhile the engineers trace the branches of the trenches, and the first parallel in the manner already described, and the work is advanced as fast as possible.

As much work is undertaken as the pioneers can be expected to perform this first night: and in proportion as the tracing goes on, the engineers place the pioneers, making them file off one by one, each carrying his fascine under the right arm if the place is on the right, or under the left if it is on the left, to the end that by the position of their fascines, which they lay on the ground along the tracing, and on the same side as they carry them, they may be enabled to distinguish the side of the place, that is, the side towards which they ought to throw up the ground in order to cover the trench from the fire of the town. As fast as they are placed, they are ordered silence, and made to lie down with their face on the fascines, and not to begin to work till commanded. The whole operation begins at the same time, that they may advance equally. When every thing is ready, and the pioneers are all placed along the tracing which is purposed to be made this first night, orders are again given for them to work; and then they all set about it with all the diligence possible till day-light, that they may be covered against the fire of the place, which is still very dangerous in the morning, considering that the trench has not had time as yet to be rendered so perfect as it ought. The troops that are to support the pioneers are put under cover on the back of that part of the trench which is finished; that is, on the border of the trench opposite to that on which its parapet is raised; they are made to lie on their faces; after which the pioneers, who have been upon duty in the night, begin to file off, and others fill up their places. It is very difficult this first day to render the trench as complete as it should be; but no pains are spared to make it as complete as possible.

As the design cannot be now concealed from the enemy, the guard mounts the next day with drums beating about noon; and care is taken to continue the work of the trenches the second night, in the same manner as the first, that is, by placing the pioneers uncovered, because they are at such a distance from the town, that the fire is not yet dangerous enough to require their being placed otherwise: the work goes on quicker in this manner; but it must necessarily be altered as soon as the workmen come within musket-shot of the place.

The first night is the best adapted for advancing the works of the trenches, because of the distance from the place, which is too great to apprehend any danger from the enemy's fire. Sometimes it happens so, that the ene-

my is not apprised of these works; especially when all the necessary precautions have been taken to conceal them, and in that case the business is done in a manner without loss or danger. It is of importance to advance them with such expedition, that they may be fit to receive the troops, who are to support the pioneers, in order to cover them against the fire of the place; and as the first parallel is designed for this purpose, therefore it cannot be perfected too soon.

According to marshal Vauban, the first place of arms, though begun the first night, has need of a second and a third, before it can be completely finished and in condition to hold the troops that are to guard the trenches; but the works for perfecting this line will not hinder the besiegers from advancing to the second parallel, which ought not to be begun till the fourth night. It is to be observed, that the guard who mount the trenches are changed every day; they mount about noon, and they are to be as strong as shall be requisite for opposing the sallies which the garrison of the place may make against the workmen. They are generally equal to two-thirds of the garrison, because the enemy may fall upon the trenches with that number, reserving the other third to guard the town. But as it is possible that the besieged may think proper to sally forth with their whole force, and fall upon the workmen, together with the troops that support them; therefore, in order to guard against every accident of that sort, the troops in the trenches ought to be nearly equal to those of the place, especially in small towns, where a few are sufficient to guard the posts, or where the burghers are so well attached to the prince, that the commandant may depend upon their fidelity in guarding the town; because in that case he may make a general effort with his whole garrison against the troops in the trenches.

We have observed, that the second night the pioneers may still be placed uncovered; but the third it would be very dangerous to do it, because of the enemy's fire being too near. When the engineers are of this opinion, they take care not to expose the men any longer uncovered, and then the works are carried on by sap.

§ 8. Of the Sap.

LET ABC be the part of the trenches advanced to A, so near the town as to render it impossible, without evident danger, to work any longer at the approaches, unless the men have some cover against the fire of the place: and let the branch AD be traced by the engineer, not with a cord, as at the opening of the trenches, but with some picquets, which he has taken care to place in the direction this branch ought to have, to serve as a guide to the workmen. A cut is made in the parapet BA of the trenches; and then the men designed to work by sap, who are therefore called sappers, will move forward through the opening A, successively eight in number. The first is to roll before him a mantlet to cover him against musket-shot. He advances as far as is necessary to place a gabion on the line AD; and this gabion being set on its base, in the proper situation, with the picquets uppermost, the sapper makes a little trench behind, about six inches distant from the gabion, of a foot and a half in depth, and as many in breadth, and he empties the earth of this ditch into the gabion. This done, he places a second gabion near the first, in the same manner, and always under the cover of his mantlet; in like manner he makes a ditch behind, the earth of which serves to fill his gabion. Thus he places a certain number, till he grows tired of the operation.

The second sapper, who immediately follows him, widens the ditch made by the former by six inches, on the opposite side to where the gabions are placed, and makes it half a foot deeper. The earth he digs up serves to fill the gabions of

Plate
DXXXL
fig. 6.

Of sieges. of the first sapper. The third sapper widens the ditch of the two first likewise half a foot, and he deepens it in the same proportion.

At length the fourth enlarges it also in the same proportion, in breadth and depth; and then the trench is three feet wide, and the same in depth, which is as much as it ought to be. The earth dug up on this occasion is sufficient, not only to fill the gabions placed by the sappers, but likewise to make a parapet of the rest, which is thrown up, and is strong enough to resist musket-shot. The third and fourth sapper lay the fascines over the gabions, with their hooks, or otherwise; then they press them down, so that the stakes of the gabions shall keep them firm. As the sappers are ranged by brigades of eight each, while the first four are working at the sap, in the manner above described, the other four furnish them with gabions, fascines, and whatever other things they want. But when the first four are tired, the four last take their places, and work in the same manner; after which they are relieved by the first, and so alternately, till each has performed his part at the head of the sap.

When the first gabions are placed, and the sap is not as yet perfected, the part in which the gabions touch one another being less solid than the rest, their joints are filled up by sand-bags, which are taken away when the work is completed, or those interstices are filled up with small fascines called *sap-faggots*.

This is the nature of the sap; a work so much the more considerable, as it is performed by day as well as night. Several saps are carried on at the same time; and there is one to both sides of each of the attacks for the second and third parallel. There are likewise saps to each of the advanced parts, and to the half-places of arms or parallels.

We have supposed that the first sapper covered himself with a mantlet; this was the custom formerly, and an excellent custom; but now it is more usual to have a stuffed gabion. He rolls this gabion before him, and uses it in the same manner as he would the mantlet. Though care be taken to give a stuffed gabion to the directors of the saps, yet it happens sometimes that the sappers will not make use of them: for as the weight of this gabion renders it sometimes troublesome to roll, they choose to do without it; and are satisfied with rolling several gabions before them, near one another, and with working behind them. These gabions are indeed of little defence, but are sufficient to conceal them from the enemy, who cannot tell the gabion behind which the first sapper is. But as the preservation of these men is of great importance, they ought to be obliged to work behind the stuffed gabion: for the same reason, the first sappers should have a cuirass, and even a head-piece, musket-proof.

There are three sorts of sap; the simple, viz. that which we have been describing, the double, and the flying sap.

1. The simple sap, or the sap without any other appellation, is made on one side, or, which is the same thing, has only one parapet. 2. The double sap has a parapet on each side, and is carried on wherever its two sides are seen from the place. 3. The flying sap is that in which they do not give themselves the trouble of filling the gabions with earth; it is made where the workmen are not much exposed, and in order to accelerate the approaches.

As soon as the men have brought the sap to its proper perfection, the pioneers are ordered forward, and these make it of the same width as the other parts of the trenches; upon which it changes its name of sap to that of trench. It is called a *trench*, if it serves as a way to the town; and a *place of arms*, if it be parallel to it, and designed to lodge troops.

See Plate DXXXI. fig. 7, 8. DXXXII. fig. r. 2. See also the upper compartment of Plate DXXVIII. for figures of the different instruments used in this and other operations of a siege.

§ 9. Of Batteries.

CANNON is made use of at a siege for two different purposes; the first to drive away the enemy from their defences, and the second to dismount their guns.

To produce these two effects, the batteries should not be above the mean reach of cannon shot from the place; that is, above 300 fathoms. Therefore there is no possibility of constructing them till the first parallel is formed; and as the distance of this first parallel from the place is generally 300 fathoms, the batteries must be on this line, or beyond it, nearer the town. They must always be placed, when the ground will permit, on the produced faces of the works attacked, as we have mentioned in the maxims of attack.

Let Z be the centre of the place attacked, and the trenches, as well as the parallels, completed. To find a proper position for erecting batteries, produce the faces AD, AC, BE, BF of the two bastions attacked, till their prolongation cuts the first parallel. Produce also the two faces OM and OL of the half moon MOL of the front attacked, and the faces HG and IK of the two collateral half-moons 1 and 2, to the first parallel, and erect batteries on these produced faces, as you see in P, Q, R, S, T, U, X, and Y.

They are advanced beyond the first parallel 40 or 50 fathoms; and are parted from the trenches, to the end that they may be used with greater ease and convenience, and less trouble to the workmen.

§ 10. Of Sallies.

THAT we might not interrupt the making of the trenches, we conducted them to the foot of the glacis, without taking notice of sallies; that is, attacks which the garrison may make against the trenches, with a view of ruining or retarding the works. As it is not to be presumed that the enemy will suffer themselves to be straitened in the town without using some endeavours to prolong the siege, and as sallies seem to be one of the principal means they can employ, it is proper to point out the conduct to be observed, not only for preventing their effects, but likewise for rendering them disadvantageous to the enemy.

Sallies can be attended with no success, unless they are made at a time when unexpected. When the workmen are suddenly fallen upon, they are scattered, and obliged to fly; which must occasion confusion and disorder among the troops that are to support them; and it requires some time before they can be brought again to order, and made to charge the enemy. In the meanwhile the latter avail themselves of the opportunity to fill up the trenches, and to do all the mischief possible: but when the troops are upon their guard against every design of the enemy, if the latter stir out of the place, they are suffered to advance; and care is taken to cut off their retreat, by means of the cavalry and the picquet, in case they should advance too far into the field: otherwise they are fired at from the places of arms, and other works within reach; and then they are briskly attacked by the grenadiers and the troops upon duty in the trenches. Care, however, must be taken not to pursue them too far, for fear of the fire of the place, which never fails to be extremely sharp when the enemy have got back to the covert-way.

In proportion as the works advance towards the town, sallies become more dangerous to the besiegers, because the enemy may fall upon the trenches more readily; for which reason,

Plate DXXXII. fig. 3.

Of Sieges. reason, double care should be taken to straiten them more closely, and to prevent their falling out with impunity. As the works carried on beyond the second parallel are more exposed than the rest, because of their proximity to the covert-way, no part should be advanced without being well supported. Hence, as we have already taken notice, half-places of arms are formed, in order to support the head of the trenches, till they reach the third place of arms; which must be set about with the greatest care and expedition possible. When this is done in the manner it ought, there will hardly be any farther danger from the sallies.

Sallies are seldom made in the day-time but by a presumptuous enemy, who imagine they may safely attack and defy the troops on duty in the trenches: but they are easily repulsed, unless the besiegers are so weak as not to be able to furnish a sufficient guard for the trenches; in which case they ought not to continue the siege, lest they run a risk of being at length entirely defeated.

At the opening of the trenches, and when the besiegers are at a good distance from the place, there is little occasion to be afraid of any sallies in the day; for there would be full time enough to prepare to receive them before they reached the works. If the enemy are disposed then to issue forth, they will do it by night; but it will be an easy matter to get intelligence of any attempt they may make, by ordering parties of 10 or 12 men, headed by a serjeant, to range in the night between the trenches and the town.

These men may lie on their faces as near the place as possible; remaining in profound silence till they hear or perceive some motion in the covert-way; then they should send one of their own body immediately to acquaint the lieutenant-general who that day commands the trenches, and the rest should continue there as long as they can be concealed, to see which way the enemy direct their course. This caution is not only simple and easy, but sufficient to guard the besiegers against surprise, and to enable them to give a warm reception to the enemy.

When the works are advanced pretty near to the place, for instance, to the third parallel, if the enemy should then sally out and fall upon the workmen, the latter must be ordered to retire quickly to the back of the third place of arms, and let the guard fire briskly upon them, without minding the overturning of a dozen or two of gabions; for the galling fire of the small arms, to which the enemy are exposed during this expedition, will make them pay dearly for what little disorder they occasion.

§ 11. *Of the Lodgments on the Glacis, and the taking of the Covert-way.*

WE left the works at the foot of the glacis, and at the third parallel; our business is now to make a lodgment there, and to go on with them till we have driven the enemy from the covert-way.

Our being then so near the covert-way, renders it impossible to defend from it; but in order to prevent the effect of enfilading, it is necessary to make the trenches much deeper in the glacis; the fire of the covert-way being very near, cannot plunge into those deep trenches, which renders it less dangerous to abide there than it would otherwise be were it not for this precaution: or they are made with traverses much in the same manner as in the covert-way, by which means the enfilading will be prevented in part, though not entirely.

In regard to the figure of the lodgment on the glacis, it varies according to the different circumstances or position of the works by which it is defended. The common way is to make several short turnings or zig-zags upon the ridge

of the glacis, in the direction of the salient angle of the covert-way, and continued to this angle; or you begin with making two or three short turnings towards the foot of the glacis, from whence you ascend afterwards by a direct trench, or sap, in the following manner.

Two sappers roll each a mantlet, or stuffed gabion, before them on the ridge of the glacis; each making a sap, one on one side of the ridge, and the other on the other. The ditch is dug deeper than usual, in order to cover them the better against the fire of the place. This work, which advances on both sides at the same time, and both sides covered, each with a parapet, is what we called a *double sap*. In the middle they make traverses three fathoms thick, and of the same breadth as the trench. On each side small passages are made like those overagainst the traverse of the covert-way, to the end that the communication thereof be not interrupted.

These traverses are constructed so near to each other, as to be a sufficient cover, by their elevation and distance, against the fire of the place. In order to guard against the effect of the grenades, upon coming within their reach, that is, within 14 or 15 fathoms of the covert-way, care is then taken to cover this trench with blinds, or, which is the same thing, to cover the upper part of it. The first and second figures of Plate DXXXIII. will show this direct trench. The first exhibits the plan, and the second the profile, which passes over one of the traverses.

All this being done, and the third parallel finished in the manner we supposed, they advance from this parallel upon the glacis to each of the salient angles of the covert-way of the front attacked, and they begin with making two or three short turnings, as marked on Plate DXXXIII. fig. 6. along the ridge of the glacis, so as to occupy about one-third thereof. These are to be made as deep as is necessary, to be a shelter against the fire of the covert-way; afterwards they may proceed directly along the ridge of the glacis, by a deep ditch, to the salient angle of the covert-way. M. Vauban observes, that if we follow directly the ridge of the glacis, this trench is made without much danger: for the palisade which is placed at the salient angle of the covert-way, and the other two next it, do not present directly to the ridge, but only opposite to the faces; where at the most there is only room for one or two fusileers to see the head of the trenches, and who are easily silenced by the fire of the third parallel, which ought to be well served, and likewise by that of the ricochet.

Upon coming to the middle, or two-thirds of the glacis, two new saps are made, *b b*, *ibid.* which embrace both sides of the covert-way, to which they are almost parallel. Their length is 18 or 20 fathoms, and about five in breadth. They are covered at the end with crochets and winding traverses, which prevent the fire of the covert-way from enfilading them easily.

The parapet of these saps is raised about eight or nine feet above the glacis; and by means of gabions, three banquettes are made, as may be seen Plate DXXXIV. fig. 5. The soldier placed on the upper banquette is thereby raised high enough to plunge into the covert-way, as appears from the same figure. When this work, which Marshal Vauban calls the *cavalier of the trench*, is once finished, it is very difficult for the enemy to remain anywhere in the covert-way; for they would be too much exposed to the fire of the soldiers placed on these cavaliers. But these places of arms or cavaliers cannot be made without being protected by the ricochet batteries, which enfilade the covert-way.

These cavaliers being once finished, it is easy to carry on the direct trench, as far as the salient angle of the covert-way,

Of sieges. way, and to establish at the point of this angle and on the head of the glacis a small lodgment bounded by a circular arc; whence the enemy may be entirely driven from the salient place of arms of the covert-way. Afterwards this lodgment may be widened on branches of the covert-way, by digging into the upper part of the glacis, at the distance of three fathoms from the inner side of the covert-way; to the end that this thickness may serve as a parapet to the lodgment, and screen it from the cannon.

The operation we have been describing, to reach from the third parallel to the salient angle of the covert-way, is formed at the same time against all the salient angles of the front attacked: hence the enemy is obliged to abandon them almost all at the same time; and the lodgment on the glacis is afterwards advanced on both sides of these angles, towards the re-entering places of arms of the covert-way.

As it is impossible to make this lodgment defile from the works of the place, there is no other way to guard against the enemy's fire than by many traverses. The 5th figure of Plate DXXXIII. shows the plan of part of this lodgment with its traverses; which are made with chandeliers and gabions. If the enemy, notwithstanding the cannon and bomb-batteries à ricochet, and the fire of the cavaliers of the trenches, should obstinately continue in the re-entering places of arms of the covert-way; in order to compel them to remove, batteries for throwing of stones are raised overagainst those places of arms: and with this view, as soon as the lodgment of the glacis is brought within one half or two-thirds of the branches of the covert-way, on both sides of the re-entering angle, a sap is carried on opposite to the place of arms; and on this sap batteries for throwing stones are erected, as may be seen in *cc*, Plate DXXXIII. fig. 6. These batteries being finished and ready to play, they discharge a shower of stones into the place of arms (fig. 6.), which will not suffer the enemy to maintain themselves there any longer. The lodgment continues to advance; and as soon as the enemy is driven from the place of arms, it is continued all round the faces thereof. This lodgment being properly finished, will hinder the enemy from venturing to return to the covert-way; and of course will secure the possession of it to the besiegers. These lodgments are made with gabions and fascines; the gabions are filled with earth, fascines are put over them, and the whole is covered with earth; they sink into the glacis as deep as is requisite to be covered against the fire of the place.

In the whole of this account we have not made use of mines; because we were willing that the description of the works, which are carried on from the third parallel, in order to become matters of the covert-way, should be as plain as possible. This omission we shall now supply, by making mention of the principal difficulties occasioned by mines, in endeavouring to drive the enemy from the covert-way.

Without mines the enemy would find it very difficult to retard the works we have been describing; because the ricochet batteries must gall them excessively, and break up their defences, so as to deprive them of all shelter: but they may have some resource left in works under ground, where their miners can proceed with more safety; while those of the besiegers, not having the same knowledge of the ground, can only grope in the dark; so that it is altogether a mere chance if they find out the enemy's galleries, and succeed so as to destroy them. If information is received that the glacis is countermined, there can be no manner of doubt but the enemy will avail themselves of their countermines, to carry branches forward into the field; and then to avoid, as much as possible, the mischief that may be done by those

subterraneous fires, in the third parallel shafts or pits are sunk 18 or 20 feet deep, if the ground will permit, in order to get below the galleries of the besieged: and from thence galleries are carried on towards the covert-way, to meet with those of the enemy, by boring the earth with a long iron needle or augre, to find them out. If they are found underneath, an opening is made down into them, and shells are thrown in, to drive away the enemy and to ruin their gallery. If, on the contrary, they are found above them, a small mine must be sprung to break them: but if none of the enemy's galleries can be found, in that case branches must be carried to the right and left; at the end of which are made small chambers, to shake the neighbouring ground, which can hardly miss destroying the galleries and chambers of the besieged.

Notwithstanding all the care that can be taken in this case, it is not to be presumed that the mines of the besieged under the glacis should be rendered absolutely ineffectual; but as soon as any of them are sprung, workmen are immediately sent to make a lodgment in the pits. In some grounds, the mines of the besieged may be spoiled, by letting in a brook or rivulet into the galleries; for which purpose you have only to dig pits in the neighbourhood, and let the water run in. The expedient was made use of at the siege of Turin in 1706, whereby a great many mines of the besieged were rendered useless.

The enemy should have mines placed, to hinder the lodgment on the head of the glacis, within four or five fathoms of the palisades of the covert-way; to the end that in springing them the palisades may not be hurt, but that they may be under the lodgment which the besiegers make there. When they have sprung the mines, they make lodgments in them; and the besiegers likewise on their part spring mines, with a view to destroy the palisades; but nothing that is not very general can be said on this sort of contests. They depend on the situation of the ground, and upon the capacity and understanding of those who attack, and those who defend the place.

Before we made mention of mines, we supposed, when treating of the lodgment on the top of the glacis, that the fire of the cavaliers of the trenches, together with the cannon and ricochet bomb-batteries, had obliged the enemy to quit the covert-way; but if, notwithstanding these fires, they should obstinately continue in the places of arms and behind the traverses, the way to drive them entirely from thence, and to make the lodgment we have been speaking of upon the glacis, is as follows.

Whether the enemy has sprung a mine near the salient angle of the covert-way, or the besieged have blown up some of the palisades near it, as soon as the mine is sprung, workmen must be sent to the excavation; where they are to cover themselves with all possible expedition, and afterwards to extend their lodgment in the covert-way on both sides of its salient angle.

The double trench, or the double sap on the ridge of the glacis, must be made to communicate with this lodgment, in order to be able to sustain it if there should be occasion, and to communicate with it more safely. Particular care must be taken to cover the extremities of it, that is, to make traverses everywhere, in order to be sheltered from the fire of the other parts of the covert-way, where the enemy still maintain themselves.

When this lodgment is extended to the first traverses of the covert-way, if the enemy keep their ground behind it, as there can be but few under cover there, considering the space they have to occupy, a company of grenadiers must make a brisk attack to drive them away: this done, some of those grenadiers should endeavour to find out in the part abandoned

Of sieges. abandoned by the enemy the entrance into the mine, and the *Sauvissou*; and upon finding it, as there is great probability that they will, they are to cut it off, and thereby render the mine useless. Workmen may be likewise sent into the passage round the traverse, and there make a small lodgment, which will be the safest that can be contrived when the enemy is so very near. After this an entrance is to be dug in the covert-way opposite those traverses, and continued towards the bank of the ditch, under cover of the traverse; then a sap is to be made from each of the extremities of this passage, that is, near the border of the counterscarp; which are to be carried along the rounding of the counterscarp towards the middle, where they are to meet. This lodgment must be made very deep, that it may be no hinderance to that on the head of the glacis; and it is to be managed so as to leave between it and the border of the ditch a breadth of earth sufficient to resist the cannon of the flanks and the curtain. This lodgment must be also covered with blinds, to prevent the effect of the grenades; and it is of great use towards an opening into the ditch.

During the whole time that the besiegers are working upon this lodgment in the interior part of the covert-way, they are to continue the lodgment on the top of the glacis, as far as the re-entering places of arms; from whence the enemy may be driven by ordering a few companies of grenadiers to attack them, supposing they should be so obstinate as to continue there, notwithstanding the fire of the ricochet batteries, and of the shells and stones. As soon as the enemy have entirely withdrawn themselves, a lodgment must be made there, as we have already mentioned.

§ 12. *Attack of the Covert-way sword in hand.*

THERE is another method of driving the enemy out of the covert-way, more expeditious indeed, but at the same time more bloody, more precarious, and infinitely less skillful. This consists in making a sudden attack on the whole front of the covert-way, in driving the enemy from thence by main force, and afterwards making good a lodgment.

There may be circumstances that shall absolutely require this method of attacking the covert-way; as when there is no possibility of erecting ricochet batteries to fire at its branches, nor at the faces of the works in the front of the attack; or when it is presumed that the enemy are not in a condition to withstand an attack of this sort; or, in fine, when it is thought expedient to run any hazard in order to be masters of the covert-way a few days sooner: on such occasions it is usual to take this method of attacking it, which is conducted thus:

When the resolution is taken to attack the covert-way sword in hand, the third parallel should be made to advance as near as possible to the glacis; and the more forward it is brought, the safer the attack. All along this parallel banquettes are to be made, step-fashion, to the top of its parapet, that the troops designed for the attack may pass over it with ease. At the back of this line, and in the very line itself, a great quantity of materials, as tools, gabions, fascines, sand-bags, &c. must be got ready, that nothing may be wanting to make the lodgment with all expedition, after driving the enemy out of the covert-way. A strong party of grenadiers is ordered, and placed along the third parallel, four or six deep, and the workmen behind them on the back of this parallel with their tools, gabions, fascines, &c. Care, moreover, is taken, that all the other parts of the trenches be well furnished with troops to support the grenadiers, if there should be occasion; and to fire at the enemy's defences wherever they appear: the grenadiers must also be provided with hatchets, to cut down the palisades of the covert-way.

Of sieges. The guns and mortars must be ordered to be ready to support the attack with their whole fire.

A signal is to be agreed on for all the troops that are to commence the attack, to move at the same time, and to fall upon the enemy. This signal is to consist in firing a certain number of cannon, or a certain number of bombs, and at the last cannon-shot, or at the last bomb, the troops are to move.

The signal being given, all the troops of the third parallel are to move at the same time, and to pass quickly over the parapet of the parallel, and to march directly to the covert-way; which they enter either through the sally-ports or passages made by the guns, or else the grenadiers cut down the palisades with their hatchets. As soon as they have entered, they charge the enemy vigorously; and when they have obliged them to abandon some of the angles, the engineers set the workmen about making a lodgment on the ridge of the glacis, opposite to that part of the covert-way which the enemy have abandoned, and within three fathoms of the inside of it. This lodgment, as we have observed, is made with gabions, which workmen lay on the glacis on the side of one another. The joints are covered with sand-bags, or with sap-faggots. These gabions are filled with earth and covered with fascines; and a-top of all you are to throw earth taken out of the glacis, by digging and widening the lodgment; and of this a parapet is raised to screen the troops as quick as possible from the direct fire of the place, and traverses are to be made everywhere to prevent the enfilades, as may be seen in Plate DXXXIII. fig. 5. While this is doing, the batteries of the trenches are to fire incessantly upon the defences of the place, in order to disturb the enemy, and to abate as much as possible the briskness of their fire upon the workmen and the lodgment.

When the troops employed in the attack have driven the enemy from the covert-way, or from their places of arms, they retire behind the lodgment, where they kneel down till it is in a condition to cover them. Sometimes it shall happen that the enemy, who was supposed to have been driven from the covert-way, will return to the charge, and oblige the besiegers to renew the attack, by overthrowing the lodgment and falling upon the troops unawares. This attack may be renewed several times, and vigorously disputed, when there happens to be a strong garrison. In this case the besiegers must exert their bravery, and resolutely encounter every obstacle raised by the enemy.

It must be allowed that this manner of attacking is very bloody: for the besiegers must move almost the whole breadth the glacis uncovered and exposed to the whole fire of the place. It is indeed in every respect so inferior to the former, that, according to M. Vauban, it never should be attempted but for the most essential reasons. Night is the best time for it, because the besiegers are less seen from the place, and of course the fire of the besieged is less dangerous: yet there are generals who undertake it by day. There is nothing settled in regard to this article; they are at liberty to act as they judge most proper, according to the circumstances of time and place.

§ 13. *Of the Batteries on the Covert-way.*

WHEN the enemy are entirely driven out of the covert-way, the next thing to be done is the erecting of batteries, in order to ruin the defences of the place, and to make a breach.

As it is necessary for the besiegers to make themselves masters of the half-moon C (Plate DXXXIII. fig. 6.) before they can come to the body of the place, which is flanked or defended by part of the faces of the bastions A and B opposite to its ditch; they must begin with erecting batteries

Of Sieges on the covert-way opposite those parts. They are marked on the plan *e, e*. Batteries must be also erected to make a breach in the half-moon. But before they are erected, it will be proper to consider what part of the face of the half-moon is to be attacked; or, which is the same thing, what part the half-moon is to be entered. It must not be at its flanked angle, because an opening towards the point would not afford a sufficient space to make a lodgment able to withstand the enemy, and moreover the troops would be seen in their passage by the two faces of the bastions by which its flanked angle is defended. The most favourable passage is towards the third part of its face, reckoning from its flanked angle; because by battering at the same time the two faces near this part, the whole point of the half-moon may be destroyed, and a large opening made there easier than anywhere else. Thus the batteries for making a breach in the half-moon *C* will be placed in *d* and *d*, and will occupy almost the third part of each of the faces of the half-moon from its flanked angle. These batteries are each to consist of four or five pieces of cannon.

When the faces of the bastions *A* and *B* are well enfiladed by the ricochet batteries, there will be no occasion for the batteries *e* and *e*; for those which are to batter the half-moon in breach will be sufficient; and after it is taken, if there is any necessity for ruining the faces of the bastions *A* and *B*, you may make use of the batteries *d* and *d*, by placing them in *e, e*. Batteries must also be erected to ruin the flanks of the demi-bastions in the front of the attack. It is evident that they cannot be placed but in *i, i*, on the covert-way opposite to them. They ought also to contain as great a number of guns as the space of ground will permit.

For the same reason that batteries have been erected to make a breach in the half moon, opposite the third part of the face joining to its flanked angle, those also are to be erected which are to make a breach in the bastions; they are marked *b, b*, and are each of seven or eight pieces of cannon. Batteries are likewise erected to ruin the flanks of the demi-bastions bordering upon those of the front attacked, in order to favour the passage over the ditch which is made on the side, upon a supposition that the bastion is entered at both faces, as we suppose in this example. The attacking both faces of the bastion renders the taking of it more certain and easy; but, generally speaking, it is looked upon as sufficient to make only a breach in the face of the earth of the demi-bastions towards the front attacked.

Besides all these batteries, others are erected in the re-entering places of arms of the covert-way, as in *k*, and in *k*; they serve to batter the tenaille when there is one, the curtain, and the faces of the bastions, &c. Sometimes they are of mortars for throwing of stones.

All these batteries should have 24 pounders; sometimes larger pieces are used, especially when there is any work of extraordinary strength and solidity to be demolished.

They are all to be placed on the parapet of the covert-way; and the outside of their epaulement is to graze the inside of the covert-way. It is in order to have room enough for this epaulement, that the lodgment is made on the ridge of the glacis at the distance of three fathoms from the inside of the covert-way.

The only essential thing to be observed in these batteries, is to open their embrasures, so that they shall perfectly discover every part of the place they are to batter, and have a sufficient sloping from the back to the fore-part, to fire

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as low as the bottom of the revetements (*c*), which they are intended to destroy. It is also proper to prevent the enemy's blowing them up with mines: for this end it will be requisite to dig wells deep enough round the batteries, so as to be sure of being lower than the enemy, and to make small galleries round the batteries, in order to discover the branches the enemy have underneath to blow them up.

As the construction of this sort of batteries is very dangerous, being absolutely to be made under the fire of the rampart of the place, they are sometimes masked; that is, before the part where they are erected, sand-bags or some other materials are placed, with a view to shelter the workmen from the enemy.

In order to batter in breach, all the guns should fire together, and towards the same part. They should fire as low as they can, and continue to batter the same part, till the earth of the rampart behind the revetement begins to fall, which is a sign that the revetement is entirely destroyed. This united firing, repeated in this manner against the same place, is productive of a much better effect than if the guns were to be fired one after the other; for not only a greater quantity of the wall is shaken at the same time, but, moreover, the shaking is far more considerable.

§ 14. *Of the descent, and passage over the Ditch of the Half-moon.*

WHILE the batteries on the covert-way are erecting, preparations are made for the descent and passage over the ditch of the half-moon.

The ditches are either dry, or filled with water, which may be either stagnated, or running; and even into dry ditches the enemy may let in water, only opening the sluices by which it is withheld. Each of these sorts of ditches requires a different manner of passing.

First of all, if the ditch be dry, and very deep, as from 25 to 30 feet, the descent may be made by one or several subterraneous galleries, passing under the covert-way, and terminating at the bottom of the ditch: the entrance is to begin about the middle of the glacis. These galleries are made like those of miners, and the earth is supported by boards and timber frames. They are directed in such a manner, that the opening in the ditch shall be opposite to that part of the breach where the passage is intended.

As this gallery is made sloping, the business is to have some rule for directing the slope, so as to prevent its being too small or too great: too small, if it terminated above the bottom of the ditch; and too great, if it terminated below it.

The following is a most simple way to find it out: First of all, it is requisite to take the depth of the ditch; which is done by letting fall a plummet, with a string tied to it, from the border of the covert-way to the bottom of the ditch. It is requisite also to know the distance from the entrance of the gallery to the border of the covert-way, which may be easily measured thus: Suppose the depth of the ditch is 30 feet, and that the distance from the entrance of the gallery to the border of the ditch is 90 feet, then by advancing six feet towards the counterscarp, the slope must sink two; that is, there must be always the same proportion between the length of the passage made to approach the counterscarp and the depth of the slope, as between the distance from the entrance of the gallery to the border of the

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the

(c) The revetement is a strong wall built on the outside of the rampart and parapet, to support the earth, and prevent it from rolling into the ditch.

the counterscarp and the depth of the ditch : so that if the distance from the entrance of the gallery to the border of the counterscarp is four times as much as the depth of the ditch ; then for every four feet advanced horizontally towards the ditch, there must be one sunk perpendicularly, &c. When the ditch is not deep, as of 12 or 15 feet deep, instead of a gallery under ground, the descent is made by a sap only, which cuts the parapet of the covert-way, and sinks therein as deep as is necessary for the descent to terminate at the bottom of the ditch. This sap must begin at the lodgment on the ridge of the glacis ; it is secured on both sides with blinds, to support the earth, and it must have a good epaulement on the side exposed to the place. Above it is covered with fascines and with earth, to avoid the shell-stones and grenades that may be thrown in by the enemy. Upon advancing to the foot of the counterscarp, an entrance is made into the ditch. There are generally two or three descents made for the same passage of the ditch, near enough to support each other for greater safety.

It is in the passage of the dry ditch that the enemy has the advantage in making use of various artifices to retard it. In these they are chiefly assisted by their miners, who blow up the saps by means of small mines, and sally out at the same time, neglecting nothing that can delay the progress of the work. They may likewise order 12 soldiers to fall at once upon the head of the sap : this number is sufficient to drive away the sappers, and to do some damage to that work. A few companies of grenadiers should be placed near at hand, to attack these men as soon as they appear ; and the cannon must be kept continually firing against every part, from whence the enemy may possibly sally out. As the batteries of the covert-way command all their communications, they may destroy them, or at least render them very dangerous.

In order to protect the sap at the bottom of the ditch, the besiegers may likewise make use of a kind of small galleries behind the counterscarp, near the place where the entrance is effected ; and they may pierce some loop-holes, from whence the enemy may be fired at, and a check put to their sallies, at least by day : and in regard to night, the besieged ought to be more circumspect than by day, since they can neither see the dispositions nor the troops that are ordered into the ditch to support the sappers ; so that they can only raise a false alarm, without doing any great mischief. Yet we must observe, that this passage can be made only so far as it is protected by the battery placed on the ridge of the parapet of the covert-way opposite the ditch : for as the cannon of this battery keeps continually playing against the defences of this ditch, they must ruin them of course, and destroy their parapet, so that the enemy shall no longer be able to keep any cannon there ; the consequence of which will be, that the besiegers have only to screen themselves from musket-shot, which is an easy matter.

The passage of the ditch is made on each side of the faces of the half-moon, as may be seen in *m, m*, fig. 6. Plate DXXXIII.

If the ditch is full of standing water, and the surface of it be raised to three, four, or five feet, below the upper border of the counterscarp, the descent will be easier ; because as the steps are to have but a very small slope, they may begin nearer the border of the ditch, as in the lodgment on the ridge of the glacis, and be directed in such a manner as to terminate at the surface of the water. They are to be covered on the side exposed to the place, and strongly secured with blinds, placed within five or six feet of each other. Blinds are likewise to be laid over the descent, which is to be covered with fascines, and these with earth, to prevent the enemy from setting them on fire.

In order to pass this ditch, a bridge must be made with fascines ; for which end, after breaking the counterscarp, a number of men, sufficient to occupy the whole length of the descent, are ranged at the distance of two feet from each other : these men must be covered by the parapet, and to forward the fascines from hand to hand, from the head of the passage to the opening into the ditch. The sapper in this part (for all these works relate to the sappers) will throw them into the ditch, in order to make an epaulement or covering on that side of the town which looks towards the passage.

As soon as he has flung in a sufficient number of fascines to shelter himself, and to advance a few paces into the ditch, he must throw a great number of them into the passage, in order to fill the ditch up entirely in that part. — They are laid different ways, and ranged in different beds ; which are covered with earth, in order to make them sink to the bottom. All these different beds of fascines must be fixed with long stakes, that they may keep closer together : and as the work advances, the parapet must be pushed forward, otherwise it would be impossible to effect the passage without the utmost danger.

When the passage is commanded, or fired into from the opposite parapet of the place, or from any other part, the foremost men must be covered with a great heap of fascines, or by some other contrivance ; but whatever cover it be, in that case the passage of the ditch is extremely difficult and dangerous.

After what has been said concerning the passage of dry ditches, and those which are full of standing water, it remains to take notice of those which are full of running water, and those that are dry but may be filled at any time with water. These sorts of ditches are extremely difficult to pass, unless the current can be turned and made to take a different course from that which carries it to the town ditches, or unless the besiegers can contrive to break down the sluices which keep up the water reserved by the enemy for filling the ditch.

A great deal might be said, were we to enter into the whole detail of the works necessary for passing these sorts of ditches ; we shall only touch upon the subject.

Supposing the ditches to be filled with running water, or with a river, the channel of which can be diverted no other way, which is called *draining the ditch*, it will be requisite then, generally speaking, to throw into the ditch a large quantity of fascines, loaded with earth and stones, fastened together with long stakes : thus the passage is to be pushed on, till the ditch is contracted to the breadth of 20 or 30 feet ; and then small beams may be laid across, to join the bridge of fascines to the rubbish of the breach. The filling up, and consequently the passage of the ditch, may be also forwarded, by ordering the miners to advance to the rubbish, and to spring a mine, in order to blow up part of the revetement of the work into the ditch.

Should the enemy happen to have reservoirs of water which they may open, and thereby destroy the lodgments in the ditch when they are no longer to make a stand there, the besiegers must endeavour during the siege to destroy the sluices, that is, the stone-work or timber that serves to keep up the water. This may be done by throwing a great number of bombs towards that part where the sluices are known to be situated ; if they should be broke down by that means, then the water will have a free current ; and after it has run off, the passage of the ditch must be attempted in the same manner as if it was standing water ; if there remains only a very small current, a passage must be left to drain it, as was mentioned before.

This whole operation is very tedious, difficult, and dangerous ;

Of Sieges. gerous; nay, it is impossible to be done at all without being protected by a very brisk firing, not only from all the cannon of the covert-way and the ricochet batteries, but moreover from the lodgments on the glacis and those on the covert-way.

Plates DXXXIV. and DXXXV. will illustrate all that we have been saying upon this head, concerning the descent and passage over the ditch.

Plate DXXXIV. fig. 1. exhibits the plan of the descent under ground, and that of its opening into the dry ditch. Fig. 2. represents the profile of that descent; the opening of which is made at the lower part of the ditch. Fig. 3. is a perspective view of the opening of this descent, seen from the bottom of the glacis; and fig. 4. shows in perspective the opening of the same descent, seen from the top of the breach.

Plate DXXXV. fig. 1. is the plan of the passage over a wet ditch in the open air; that is to say, the gallery of which is an open sap. A is the opening of it. You see in B, towards its opening, the blinds that are laid on its upper part, to support the fascines with which it is covered. On these blinds, at first, is laid a bed of fascines, ranged according to the length of the gallery: over this first bed is laid a second, wherein the fascines are ranged according to the breadth of the gallery, as you see in B and C. D is the epaulement of fascines, which covers the passage against the fire of the place, by which it is flanked. E is part of the bridge of fascines; and F is an elevation also of fascines, intended to cover the head of the work, and to secure it from the immediate fire of the place. Fig. 2. represents the profile of this descent into the ditch. Fig. 3. gives its opening seen in perspective from the country; and fig. 4. its opening into the ditch, also in perspective, as it appears from the top of the breach.

§ 15. *Of the attack of the Ravelin, or Half-moon.*

THE passage over the ditch before the half-moon being effected on both sides, and a breach made 14 or 15 fathoms wide, preparations are made for the assault. For this purpose a large quantity of materials is collected from all the neighbouring lodgments. Endeavours are used to render the breach practicable, by making the slope easy. The cannon continue playing, in order to throw down the parts of the revetement that may be yet standing. Very good use may be also made of shells fired point blank; for they are easily buried in the breach, the earth of which has been already broke up and shaken by the cannon; and as they burst upon that earth, they produce the effect, as it were, of small mines. Howitzers may likewise be used with success on these occasions.

In order to render the breach more practicable, some miners, or a serjeant with a few grenadiers, are sent to level it with hooks. The fire from the lodgments and batteries will hinder the enemy from appearing on their defences; or if they should, they must do it with great circumspection, which renders their fire less dangerous.

If the enemy have made any galleries along the face of the half-moon, and opposite the breaches, the miners may go and discover them, in order to stop them up, or to cut off the match, or to drive away the enemy: if they cannot find them, they spring several mines; which being often repeated, must needs occasion some disorders in the galleries and mines belonging to the besieged. Every thing being ready for making a lodgment in the half-moon, that is, for taking possession of the breach; the materials being at hand, in order to be removed hither with ease and expedition; the batteries and lodgments of the covert-way being in a condition to fire away briskly;—a signal is agreed upon with the offi-

Of Sieges. cers that command those batteries and lodgments, to give them notice to fire, and to leave off whenever it is thought proper. This signal is generally a flag raised in the former case, and lowered in the latter. All this being settled, and the breach, as we observed, made practicable, two or three sappers are sent to the extremity of the breach next to the place, there being generally a kind of small cover or cavity in this part; there they begin a lodgment for themselves, and for some more, who are sent after them; when there is room to receive them, they make them mount, and insensibly extend the lodgment upon the top of the breach; and thus they proceed till they make a lodgment towards the point, which is generally called a *magpye's nest*. While these sappers are at work, the fire of the batteries and the lodgments ceases; but when the enemy attempts to attack the workmen in order to destroy their lodgments, they must retire as quick as possible; and then the colours being raised, the batteries fire upon them with the utmost vivacity, to oblige them to quit the upper part of the breach.—Upon this the colours are lowered, the fire ceases, the sappers return to repair the mischief that was done to their lodgment, and try to enlarge and strengthen it.

This way of proceeding must be continued till the lodgment is in a state of defence; that is, till it can hold a number of troops sufficient to awe the enemy, and to withstand any attack that may happen to be made against it. The besieged, before they entirely quit the half-moon, will spring what mines they have ready there. As soon as this is done, the besiegers should directly lodge themselves in the excavations made by those mines, or at least some defence should be made there, to hold a few sappers, and to forward the lodgments of the inside of the work.

The lodgment of the point is made in the form of a small arc, the concavity of which is turned towards the place. From each of its extremities a lodgment is carried along the faces of the half-moon, on the platform of its rampart, at the foot of its parapet. This lodgment is sunk deep in the earth of the rampart, to the end that the soldiers may be the better covered against the fire of the place; there must be also traverses to secure it from the enfilades, as was done in regard to the lodgment on the glacis. Within the half-moon lodgments are also made, which traverse the whole breadth thereof, as may be seen in the half-moon C, Plate DXXXIII. fig. 6. They serve to command the communication between the tenaille and the place; of course to render that communication more difficult, and to hold a sufficient number of troops to resist the enemy; should they have any design to return and repossess themselves of the half-moon.

What we have been observing, in regard to the attack of the half-moon, is only when the besiegers intend to take it by the sap, or with pick-axe and spade: But sometimes they go about it in a more expeditious manner: for when the breach is made so as the troops may mount to enter the half-moon, they advance boldly to the assault, just as in the attack of the covert-way, sword in hand, and endeavour to come up with the enemy, and to drive them entirely out of the work. This attack is very dangerous, and may cost a great many men, when there happens to be a brave garrison, who will not easily yield their ground. But there are frequent cases in which it may be thought prudent to adopt this measure, in order to accelerate a few days the taking the half-moon. As soon as the besiegers are masters of the upper part of the breach, they make a lodgment there in a hurry with gabions and fascines; and while it is making, as also while they charge the enemy, and oblige them to abandon the upper part of the breach, some soldiers are sent to discover the mines, which the besieged are supposed to have made within

within the rampart of the half-moon, and to cut off the saucisson. If they cannot find them, they must advance with great circumspection, and take care not to keep all together, that the mine may have less effect. Oftentimes the enemy will suffer the besiegers to carry on their lodgment without making any great opposition, because it cannot be effected without a considerable loss of men; but when the lodgment is advanced, the enemy spring their mines, and return afterwards to the half-moon, in order to take it amidst the confusion which those subterraneous fires must unavoidably occasion among the troops in the lodgment; in that case, it will be requisite to renew the charge most vigorously with fresh troops, which should be at hand to support those of the half-moon, to place themselves in the excavations made by the mines, to render the lodgment sufficiently strong, and to secure it with a proper number of soldiers, so as to be able to withstand any further attempt of the enemy.

This work can hardly be disputed in this manner, except when the half-moon has a *reduit* (D), as it affords a shelter or retreat to the garrison, and enables them more easily to fall upon the half-moon. For if there should be no *reduit*, and the enemy are driven out of the half-moon, they can scarce attempt to return, especially if the communication between the place and the half-moon is discovered by the batteries and lodgments of the covert way: because, if the ditch is filled with water, this communication can hardly be made but with boats, which may be easily seen from the lodgments of the covert way, and may be overlet by the cannon of the batteries; and if the ditch be dry, and there happens to be a *caponnier*, the communication, though more safe, is not without danger, by reason of the fire that may plunge into it from the lodgments of the covert-way; so that it will be extremely difficult for the enemy to advance quick enough to repossess themselves of the half-moon; besides, they want room to assemble in a large body, and fall all at once upon the lodgments of that work.

There is only one case in which they may do it; that is, when in the angle of the gorge of the half-moon they have made a space, nearly as large as the places of arms in the covert way. This space cannot be seen from the covert way, nor from its lodgments; and as there are generally steps to ascend from the bottom of the ditch to the half-moon, the enemy might take advantage thereof to try to enter it; but if the besiegers are upon their guard, they will find it easy to repulse them, even with loss.

The best time for attacking the half-moon sword in hand, is by night, for the enemy's fire is not so sure then as by day.

§ 16. *The attack of the Bastions.*

WHILST the besiegers endeavour to possess themselves of the half-moon, they work the same time at the descents into the ditch, which are made nearly towards the third part of the faces, reckoning from the flanked angle of the bastion. A descent may be effected at each face of the two bastions in the front of the attack, as in *n, n*, Plate DXXXIII. fig. 6. or, according to the more general custom, only opposite the faces in the front attacked. The manner of proceeding is much the same as in the descent and passage over the ditch of the half-moon, whether it be dry or wet; that is, if it be dry, a sap is carried into the ditch, from the opening of the descent to the foot of the breach, and strong-

ly covered towards the opposite flank. If the ditch be full of water, it is passed over on a bridge of fascines, constructed in the same manner as in the passage over the ditch of the half-moon.

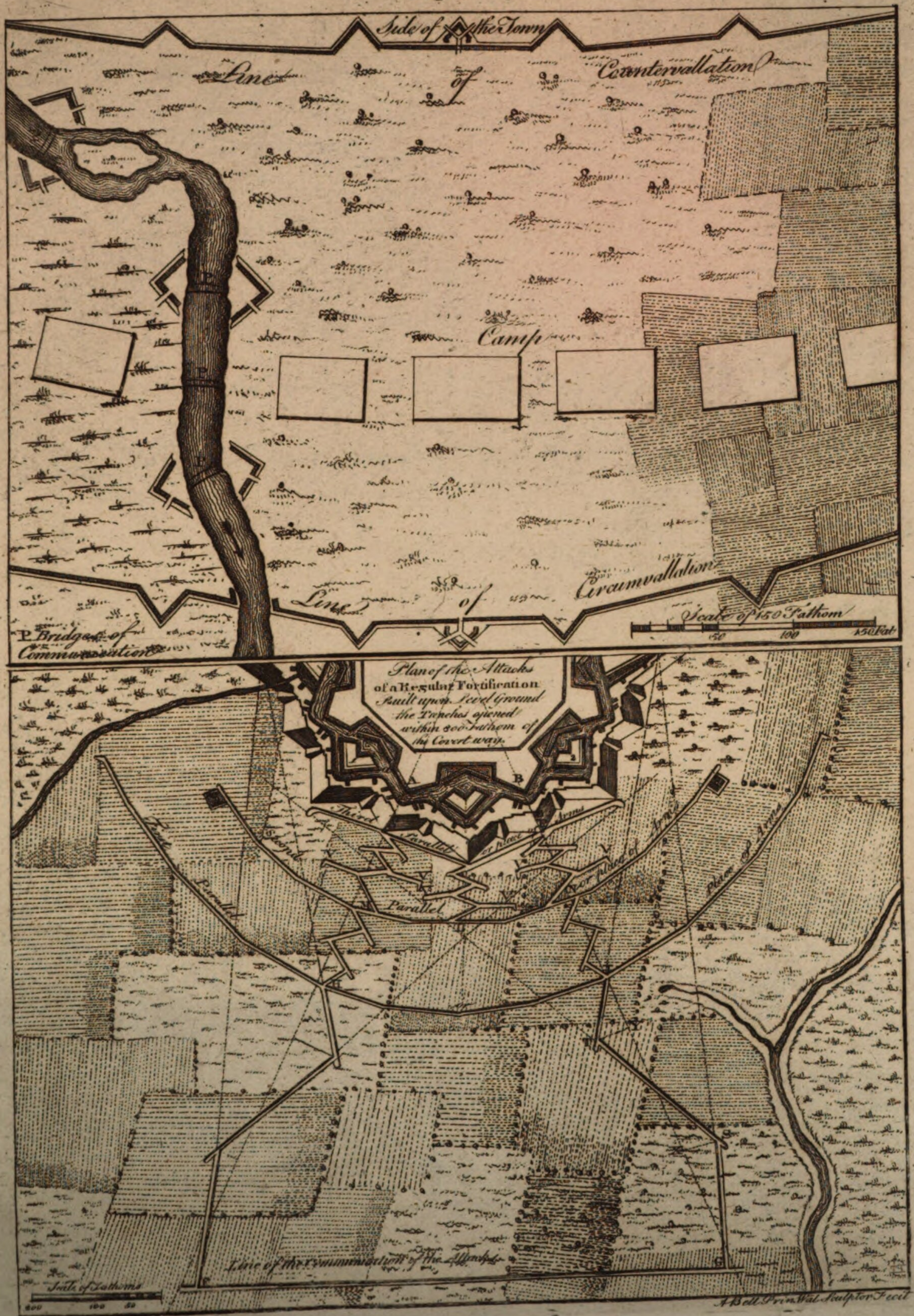
The batteries erected on the ridge of the glacis for making a breach in the face of the bastions, must fire against that part of the faces where the breach is to be effected, and fire all together, as was mentioned in the article of the attack of the half-moon; and when they have made a breach sufficient to attempt the attack in front, some of the guns must be kept to batter the upper part of the breach, and some must be removed to the back of the platform, and disposed in such a manner as to be able to annoy the enemy, whenever they present themselves towards the upper part of the breach. All this is done during the descent and passage over the ditch. Mines are also made use of to widen, and sometimes even to make the breach.

To fix the miner to the wall when the ditch is dry, a lodgment is made near the opening of the descent, to protect him from thence against the sallies of the besieged. Then the wall is broke with cannon, as near as possible to the bottom of the ditch, in order to get under the galleries which the besieged may have built within the bastion. An opening of five or six feet may be made with the cannon, to lodge the miner that removes the rubbish, and makes room for one or two of his comrades, who are to assist him to get rid of the earth in the gallery. When the ditch is dry, and the ground will admit of it, the miner sometimes gets under it by a subterraneous gallery, which leads him to the foot of the wall; but if the ditch be filled with water, it is not always the custom to wait for the completing of the passage over the ditch, before the miner is fixed to the face of the bastion. The wall is pierced with cannon, in the manner before mentioned, but a little above the surface of the water, to the end that the miner may not be incommoded in this gallery; and he is sent over in a little boat, to place himself in the hole. The miners relieve one another every two hours, to carry on their work with more speed; that is, to complete and finish their mine. At the same time, the enemy will use various artifices to obstruct them.

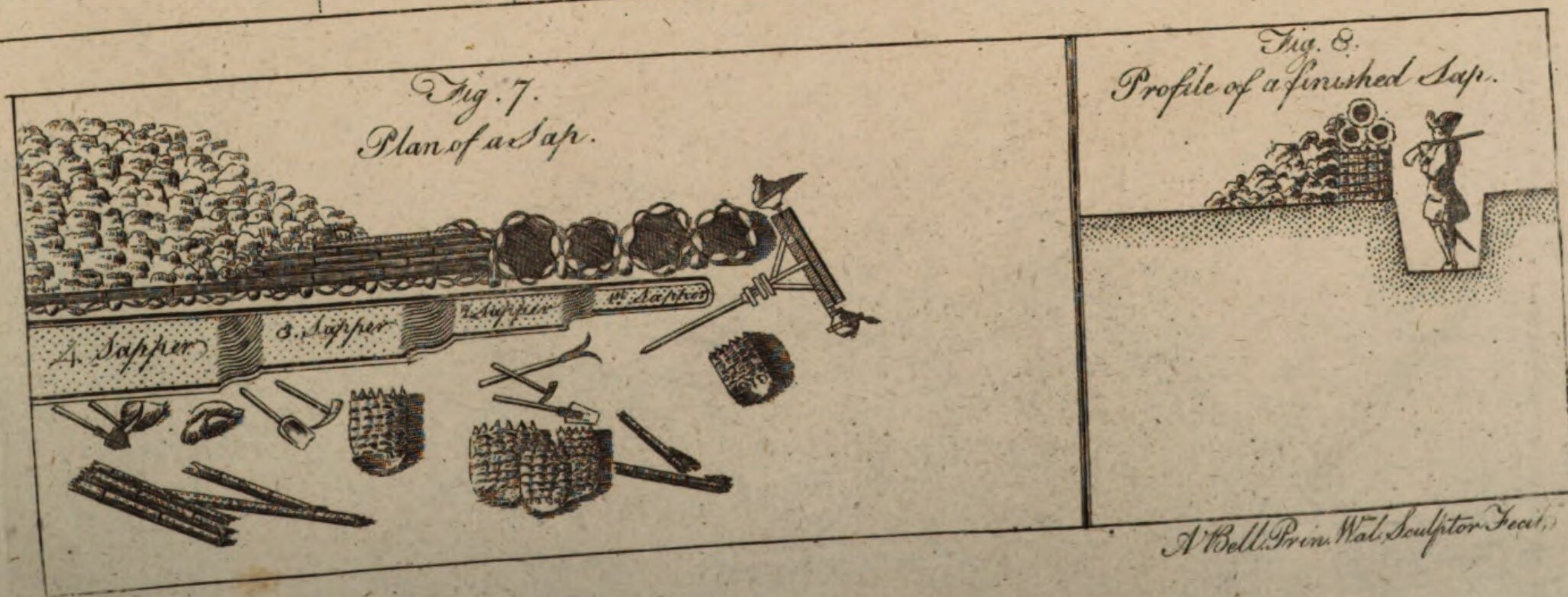
When the miner has pierced the wall, he makes behind it, on both sides of him, two small galleries, from 12 to 14 feet, at the end of which he places, on both sides the galleries, two mines, namely, one within the breadth of the wall, and the other sunk 15 feet under the rampart. A common train is given to these four chambers, which taking fire at one and the same time, will produce a very large and spacious breach.

When there are countermines under the rampart, and along its revetement, care must be taken to seize them, and to drive the miners from thence. For this purpose M. Goullon proposes to spring four fougasses* near them, in order to burst them; when this is done, he is for entering it with 10 or 12 grenadiers, and as many soldiers, commanded by two serjeants; part of these grenadiers should have each four grenades, and the rest should carry four or five bombs, of which three only should be charged, the other two with fuses only. The two serjeants should begin with attacking the countermine sword and pistol in hand, and the grenadiers should follow them. If the besieged do not appear to defend their countermine, a lodgment is quickly made with sand-bags. This lodgment consists of no more than a good traverse,

(D) The *reduit* is a small half-moon constructed within the other. It usually consists of a single wall with loop-holes; but in Landau, Neufbrissac, and some other places, the *reduit* is constructed with a rampart and parapet like the external half-moon.

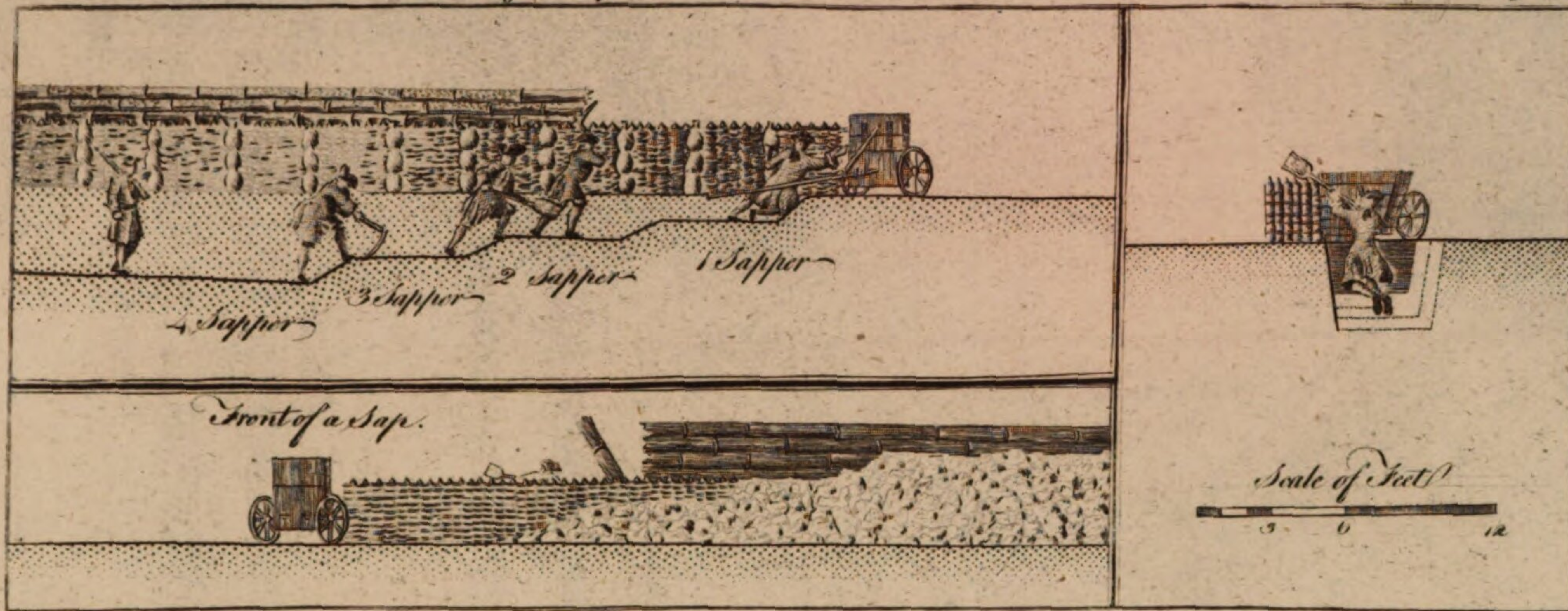




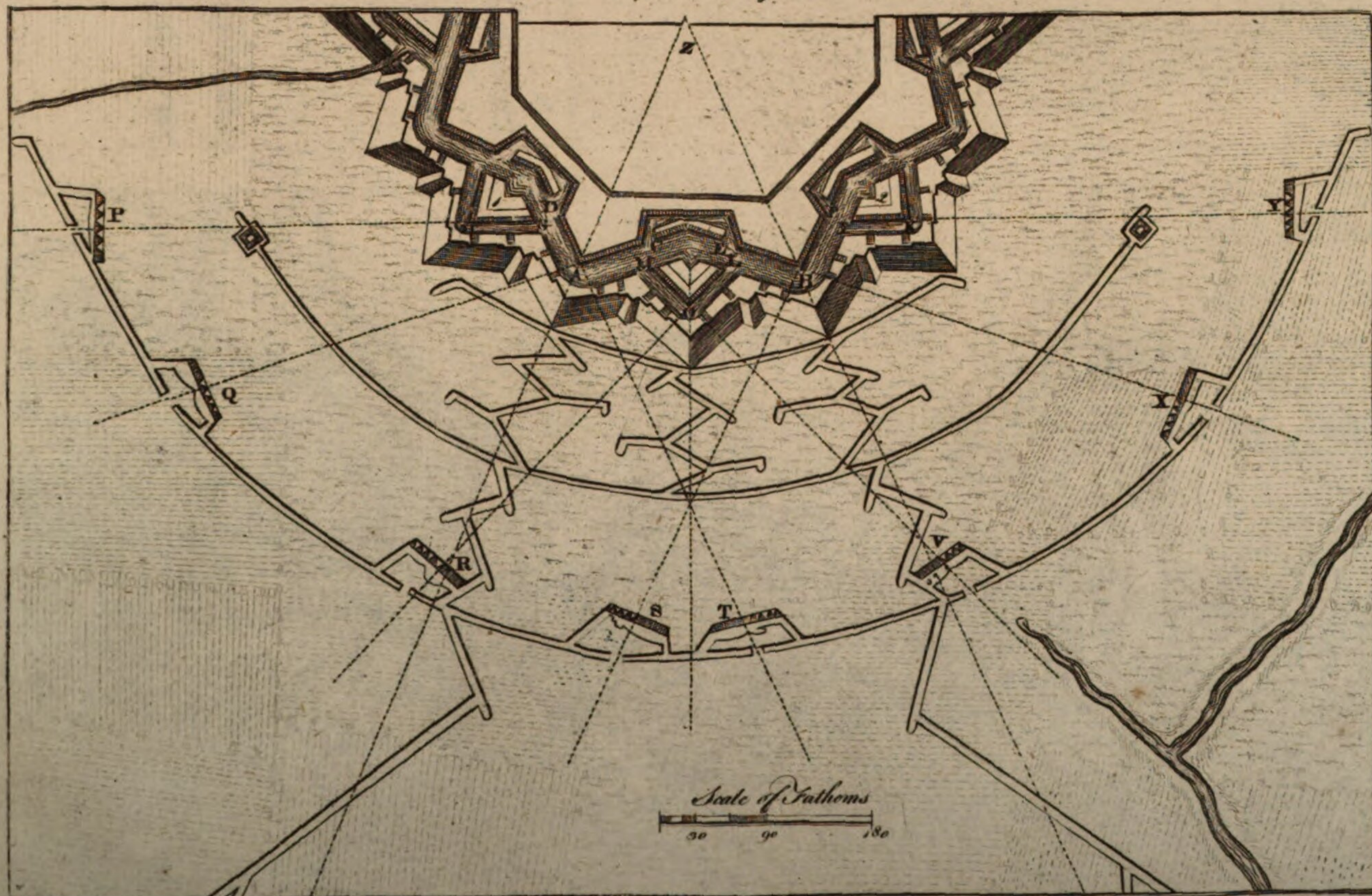


*Fig. 1.
Back of a Sap.*

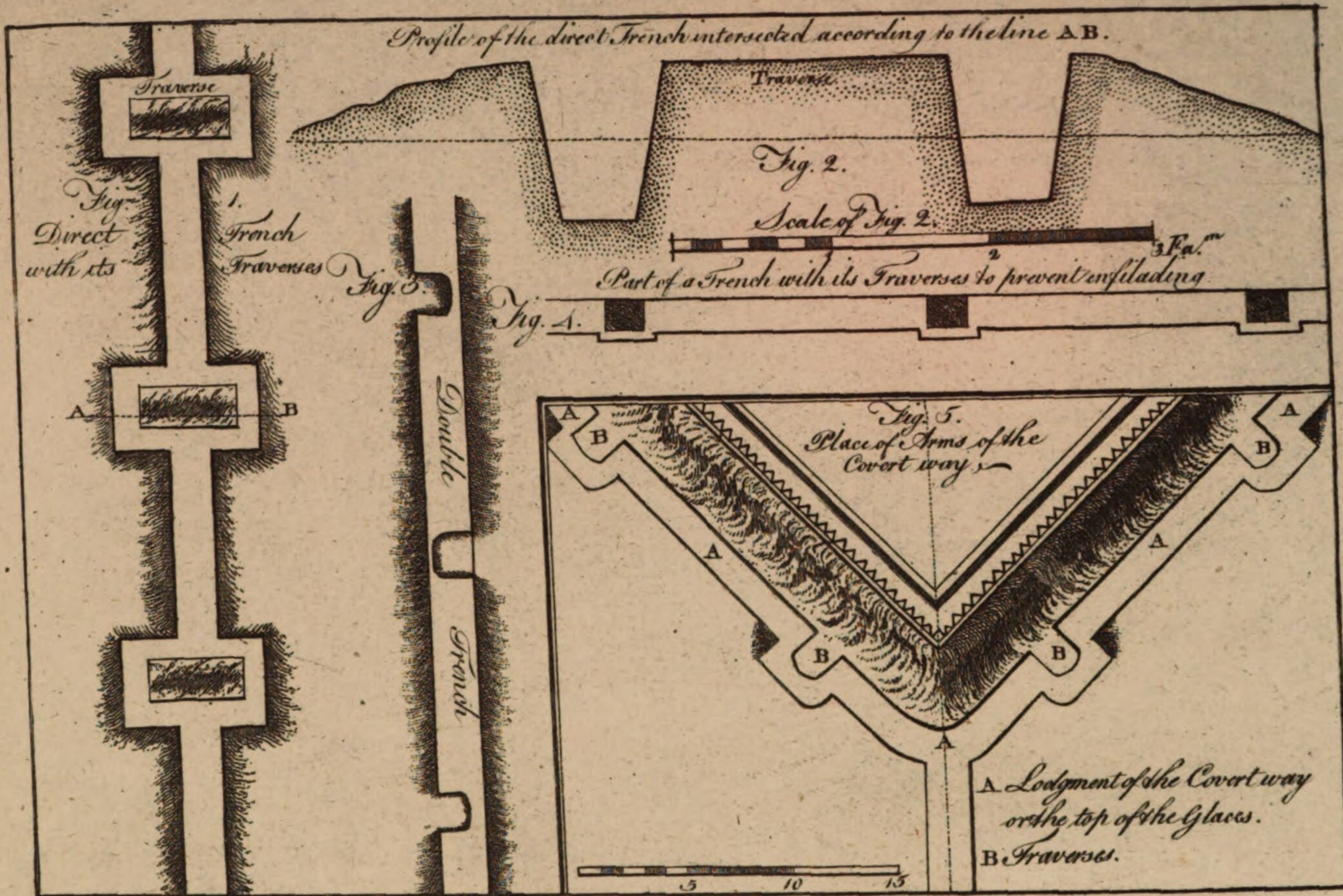
*Fig. 2.
Profile representing the excavation of a sap.*



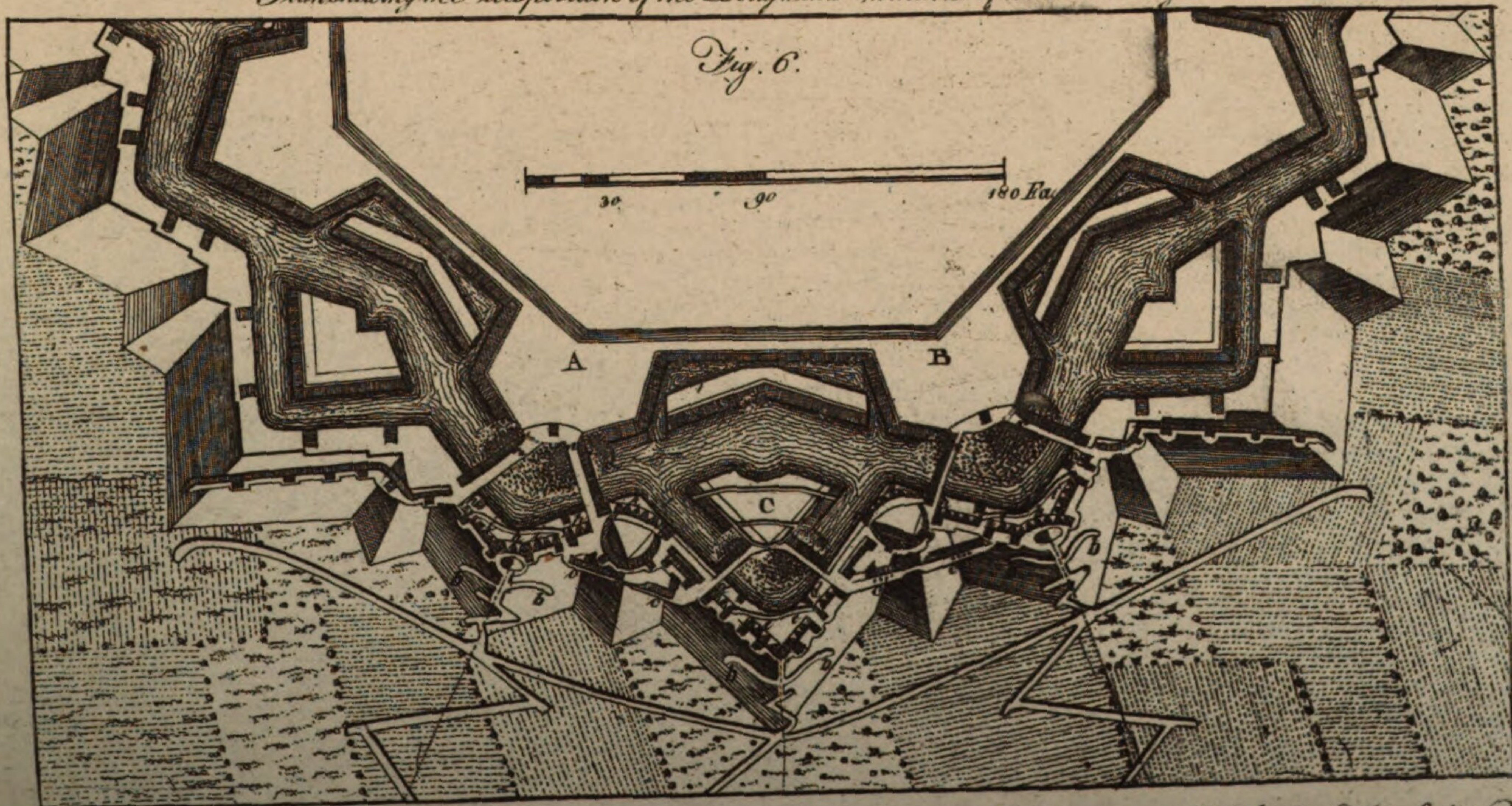
*Fig. 3.
Plan shewing the disposition of the Batteries.*



Attack of Fortified Places.



Plan shewing the disposition of the Lodgments & Batteries of the covert way.





Of Sieges. traverse, which entirely stops up the gallery of the counter-mine, towards the side from whence the enemy may come. If they attempt to oppose this operation, the grenadiers should throw their three loaded shells, and retire quickly with their comrades, to prevent being hurt by the effect of those shells; for the smoke they make in bursting, together with the splinters, must unavoidably oblige the enemy to quit the gallery for some time: but as soon as they have produced their effect, the serjeants and the grenadiers, with their comrades, must immediately return, and work as hard as possible upon the traverse, in order to stop up the gallery. If the besieged still persist in interrupting this work, the grenadiers must throw the two shells with fuses only, which will oblige the enemy to retire quickly; and as no harm is to be apprehended from them, which is more than the besieged can tell, the besiegers continue to finish the traverse. Even openings or loop-holes are made, in order to fire upon the enemy, in case they should appear again in the part of the gallery opposite the traverse.

When there is no gallery or countermine behind the walls, or when there is one which cannot easily be come at, the miner should leave no means untried to discover it; and at the same time he ought to use the utmost precaution to prevent being surprised himself by the enemy's miners, who will attempt to smother him in the gallery, and to destroy his works: therefore the business of a miner requires great art and cunning to avoid the snares of the enemy. "A miner (says M. de Vauban in his Memoirs) ought to listen frequently to discover whether there are any at work under him. He ought to sound with his augre towards the place he hears the noise come from; but the enemy often make a noise on one side, while they are at work on the other." If their miner draws too near, a small mine must be made to stiffl him in the gallery; which may be effected thus: A hole of five or six inches diameter, and six or seven deep, is made on that side of the gallery where the enemy is heard; a cartridge of the same size, and containing about 10 or 12 pounds of powder, is put into it: the hole or opening towards the gallery is stopped close with a strong tampion, which is immediately applied to the cartridge, and supported by strong planks well buttressed: this powder is set on fire by a fusee, which passes through a hole made in the tampion, and communicates with the powder in the cartridge. If the gallery of the enemy's miner is within four or five feet of this powder, it will undoubtedly burst, and the miner will be either killed, or obliged by the smoke to retire.

Another way of bursting the gallery of the besieged, when it is at no great distance, is to put several shells on the side where the enemy's miner is at work, and to range them in such a manner that they shall have their effect.—When the miners are at work in search of one another, they have great iron borers, with which they pierce the interval betwixt them, to find, as near as they can, their distance from one another. The miner must be very vigilant, and as soon as the borer is withdrawn, he should clap a pistol into the hole, which, when well directed, and fired by a man of resolution, seldom fails, as M. Vauban affirms, to kill the miner. The first shot ought to be followed by three or four more; then the hole should be cleaned with the borer, to prevent the enemy from stopping it up on their side: and this is a matter of importance, for it will hinder their miner from continuing his work in that spot, and oblige him entirely to abandon it. These and many other stratagems, which may be seen in the Memoirs of M. Vauban, plainly show that the business of a miner requires not only address and cunning, but likewise great courage and resolution, to guard against and remove the several obstacles that may be thrown in his way, with a view to pre-

vent the progress of the works committed to his direction: he may easily guard against them when he is undermost; but if it be otherwise, his situation is extremely bad. In order to know for certain whether they are at work under the gallery, the miner generally makes use of a drum with something upon it, and then the shaking of the earth must occasion a kind of trembling, which will discover that they are at work underneath. Sometimes he listens with his ear to the ground; but the fluttering of the drum is the surest way.

While the miner is working upon the construction of his gallery, the besiegers must be employed in demolishing all the works of the enemy, and disabling them from defending or repairing the breach. With this view a continual fire is made against the breaches, which will hinder the besieged from showing themselves in that part, and from advancing to see the works which may be made in the ditch or at the foot of the breaches. If there is a tenaille before the curtain, batteries are placed in the re-entering places of arms of the covert way of the half-moon, which plunge into the tenaille, and hinder the enemy from making use of it to disturb the passage over the ditch. And in order to silence them farther, another battery of mortars may be erected, in the most advanced lodgment of the gorge of the half-moon; which battery being well served, will render it too dangerous and inconvenient for the besieged to abide there, so as to have the attention requisite for obstructing the passage over the ditch.

But sometimes the enemy will make oblique embrasures in the curtain; and from thence they fire on the lodgments of the covert way, so as greatly to incommode both those lodgments and the opening of the descent into the ditch. The way to prevent the effect of those batteries, is to endeavour to destroy them with shells: and, when the ground will permit, to enfilade the curtain with ricochet firing. Four or five pieces may be also placed on the upper part of the flanked angle of the half-moon; in which position they can fire directly upon the curtain, and plunge into the tenaille and the postern, by which the enemy keep a communication with the ditch when it is dry.

Let us suppose that the passages over the ditch are finished, so as to be fit to walk over; that the cannon or the mines have made the breaches sufficiently wide for the assault; that the ascent is made smooth, and that the besiegers can easily mount to the top of the breach; then they may lodge themselves there, by following either of the two methods mentioned in the article of the half-moon.

If the enemy have made no retrenchments in the inside of the bastion, they will hardly venture to stand an assault, as this would only expose the place to be carried sword in hand, themselves to be taken prisoners of war, and the town to be plundered. Therefore every thing being ready for the assault, they will beat the chamade, that is, they will desire to surrender on certain terms.

When a resolution is taken to attack the bastions while the mines are making and charging, a considerable heap of materials is laid up in the lodgments nearest the breaches, that they may be handed readily for the construction of the lodgment, as soon as the enemy is driven away. Every thing being prepared to set fire to the mines, all the grenadiers of the army are ordered to march to the assault; and they are to be supported by a sufficient number of detachments, that the enemy may not be able to make a stand. These troops being ready, the mines are sprung; and as soon as the dust is a little laid, the grenadiers, commanded to march and to mount foremost, move on to the foot of the breach; and when they get there, they mount immediately with their bayonets fixed, and are followed by the

Of Sieges. the rest of the troops that are to support them. The enemy will not fail to make use of their mines, if they have any left; and will likewise throw all kinds of combustibles, to make the besiegers pay as dear as possible for the ground which the besieged will be obliged to yield in the upper part of the breach; for yield at length they must, and the superior numbers of the besiegers must surmount every obstacle.

As soon as they are beaten away, and have abandoned the upper part of the breach, the besiegers must set about making a lodgment; which will consist at first of a kind of arc of a circle, the convexity whereof is turned towards the enemy, if there is a breach in the faces of the two bastions, otherwise it will only be made on the upper part of the breach. The breaches are to be all stormed at the same time, by which means the resistance of the enemy will be divided. This whole time the batteries and lodgments are to fire with all the vivacity possible against the several defences of the enemy, and against every place they are in and that can be fired against, without annoying the troops that are storming the breaches.

The lodgment on the breach being made, the saps are carried on to the right and left towards the centre of the bastion, and disposed in the manner as in Plate DXXXV. fig. 5. bastion A. Cannon are brought upon the breach to batter the inner retrenchment, the ditch is passed over here also, and a lodgment is made upon the breach in the manner mentioned in regard to the bastions.

If behind this first retrenchment there be a second, the enemy, after being forced to quit the former, retires to the latter to capitulate. There they are to be attacked as in the former retrenchment, and at length they will be forced to surrender. It is very rare to see a defence carried so far as we have here supposed; but it was incumbent upon us to make this supposition, in order to give an idea of what is proper to be done, should the enemy resolve to defend the place to the last extremity.

§ 17. *Attack of a place covered with Fore-ditches, Lunettes, and other Outworks, &c.*

In order to give a more simple idea of the operations of a siege, we have explained and applied them to a place that had no other outworks than half-moons and a covert way: but a greater number of works will make no alteration in the principles here established: to take and keep possession of those works, the besiegers have only to follow the same rules; which we shall show in a few words.

Let us suppose a place surrounded by a fore-ditch, and a second covert way, strengthened with lunettes, and suppose the front by which it may be attacked is covered with a horn or crown work, &c.

First of all the trenches are to be opened as usual, in order to come to the foot of the glacis of the second covert way; the ricochet batteries are to be placed on the produced faces of the works attacked, and of their defences; the faces of the lunettes of the front attacked ought to be enfiladed by the ricochet batteries.

The second covert way is taken in the same manner as the common covert way; and then, if the fore-ditch is full of water, a good lodgment is to be secured along this ditch, and batteries are to be erected to make a breach in the lunettes, if the enemy do not think proper to quit them. It is very difficult for them to maintain themselves in those works, when their communication is seen; and they can hardly avoid being seen, when a lodgment is made all along the fore-ditch. Be that as it may, supposing that they are lined with stone-work, or only with turf, that they are fraised and pallisaded, and that the enemy are obstinate in their

defence, a breach may be made in them, by placing some cannon opposite the middle of the faces, and the ditch may be passed over by filling it with fascines or some other materials. As it is a great deal smaller than that before the body of the place, it is much easier to pass.

When the besiegers have made themselves masters of the lunettes which cover the front attacked, they begin to think of passing the fore-ditch. This is a very difficult task, because it is performed under the grazing fire of the covert way; but this fire ought to be checked by the ricochet batteries, which should plunge into the covert way on every side. This ditch is crossed near the salient angles of the glacis. It is always to be understood, however, that there is no possibility of crossing any ditch without a good epaulement of fascines, to cover the passage on the side which is seen by the place, or by the works that defend it.

When the lodgment is entirely finished on the covert way, then the other attacks are carried on in the manner before explained.

There are places which, without any fore-ditch, have lunettes opposite to the salient and re-entering angles of the glacis, which are also enveloped by a second covert way: sometimes they are vaulted and bomb-proof, as at Luxemburg; and sometimes they have only a ditch, a parapet, and a covert way.

Those which are vaulted and bomb-proof are very difficult to take; because the ricochet firing and the bombs can do them no mischief. In that case they must either be turned, or be taken by mines.

A work is said to be turned, when the besiegers get between that work and the place, and so cut off their communication. Sometimes the lunettes have communications under ground, and then there is hardly any other way of driving out the enemy but by mines. This is tedious work; but there is no remedy for it.

The lunettes and the ditch are always defended by branches of the covert way, with which they have also a communication, like those of the lunettes, A, A, Plate DXXXVI. fig. 1.

This plate, which represents part of Landau and its attacks in 1713, may serve to give an idea of the manner in which a work is turned. The advanced lunette B, as well as the work C, called a *tenaille*, are turned; that is, the trenches cut off the communication betwixt them and the place.

When this communication cannot be cut off, there will be often a necessity for attacking the lunette and covert way at the same time; and the reason is, because though the enemy should be obliged to abandon the lunette, yet so long as they are masters of the covert way, they have it in their power to return and retake it. Therefore, the sure way of keeping possession of it is to drive the besieged out of the covert way, at the same time that they are forced to quit the lunette.

The garrison may avail themselves greatly of mines for the defence of these small outworks, so as to oblige the besiegers to pay very dear for their acquisition, and be a long while in making it. But they must pursue the same methods as the besieged; they must dig deep into the earth, they must endeavour to destroy the enemy's mines, to blow up their galleries, and to make themselves masters of the lower ground. This is an essential point, without which the enemy may blow up and destroy the lodgments several times. The celebrated M. de Valiere, in a Dissertation on Mines, at the end of the third volume of M. Folard's Commentary on Polybius, shows, that in a ground 25 or 30 feet deep, the enemy may be blown up twenty times. Therefore it is impossible to be too cautious in endeavouring to get

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get under the gallery of the besieged, in order to prevent the mischief they may do by their great number of mines.

In the neighbourhood of some places there are a sort of small half-moons, called *redoubts*. When they are distant from the place, the enemy cannot maintain themselves there without exposing their troops to be taken prisoners of war; but when they are covered and defended as they ought to be, and judiciously situated, they are an object worth attention. Endeavours ought to be used to cut off the communication between them and the place, and to oblige the enemy to abandon them by throwing in shells; it may even be proper to assault them and drive them out sword in hand, provided they are not so near the place as to receive powerful succours, and be able to withstand the attack. It is a matter of consequence to get rid of these small outworks as soon as possible, because they may be of great hinderance to the progress of the attacks, by having a view of the trenches from the flanks, and enfilading them, &c.

In some sieges, when the garrison are obstinate in their defence, small outworks are made at the foot of the salient and re-entering angles of the glacis; these consist only of a parapet raised at the foot of the glacis upon these angles, each side of which has about 10 or 12 fathoms. These small works are called *arrows*. They may be seen in A, A, A, Plate DXXXVI. fig. 2. They communicate with the covert way by a passage pierced on the ridge of the glacis, and pallisaded on both sides. At the entrance of this passage is constructed a traverse B, generally called the *tambour*, which hinders the besiegers from being masters of the arrow, or discovering the inside of the place of arms belonging to the covert way.

To prevent the effect of these arrows, the best method is to ply them well with ricochet batteries, and with shells thrown in also *à ricochet*. Stone mortars may likewise be made use of, to annoy the enemy in their arrows; for as these works are but small, the stone mortars produce a very good effect. We have already taken notice of almost all the works the besiegers may meet with beyond the covert way; there remains, therefore, only to see the manner of conducting the attacks of the other outworks most commonly used in fortified towns.

§ 18. Attack of a Horn-work.

A HORN-work is nothing more than the front of a fortification, which projects into the field, and is joined to the place by two long sides. It is placed opposite to the curtains, and sometimes also to the bastions. The besiegers should endeavour, as much as possible, to avoid attacking the side covered by these works, because they are very difficult to take, and of course will greatly lengthen out the siege. But supposing there is an absolute necessity for attacking the place on the side covered by a horn-work opposite the bastion, and that this horn work has an half-moon opposite to its curtain: The trenches and parallels are to be made in the usual manner; the same method is to be used in regard to the ricochet batteries, which will also enfilade the branches of the horn-work. The taking of the covert-way of the half-moon, and of the half bastions of the horn-work, is carried on in the same manner as the attack of the half-moon, and the two bastions of the body of the place. There remains, therefore, only to show how the lodgments are to be made in this work. We will suppose that there are two retrenchments within, as in Plate DXXXV. fig. 5.

When the lodgments towards the point of the half bastions are finished, some guns are to be planted there, in order to batter the face of the opposite bastion; and they are to be placed over-against the lodgments of the flanked angles

of the half bastions. These lodgments are to be extended on both sides towards the curtain, along which saps are carried on; as also towards the orillon of the half bastions, if they are made with orillons: this will form a kind of small parallel, the fire of which will help to cover the lodgments in front, in case the enemy should make any sallies to destroy them. In large fortifications, such as horn and crown works, the lodgments ought to be carried on with the greatest circumspection, in order to be able to support them against every attack of the enemy.

As all these lodgments are commanded by the bastion, it will be requisite to dig the saps sufficiently deep, so as to be secure against their fire; and likewise to make traverses near enough to each other for the same effect.

If the bastion can be battered in breach from the rampart of the half bastions of the horn-work, the besiegers will for this purpose make use of batteries erected on these half-bastions; and for the same end they will also plant a battery of six or eight guns towards the middle of the curtain.—Should it be impossible to sink sufficiently into these, so as to batter the lower part of the revetement of the bastion, still they might be usefully employed in playing against the enemy's defences, and driving them out of their retrenchments. When the lodgments are well secured within, it will be extremely difficult for the enemy to continue in the retrenchments, without running the risk of being made prisoners of war; because the communication between them and the place will become too difficult. They might indeed, by means of a bridge level with the water, retire into the collateral half-moons: but at the same time that the besiegers endeavour to make themselves masters of the horn-work, they will also strive to get possession of these half-moons; the taking of which must inevitably follow that of this work.

As soon as the enemy are entirely driven out of the horn-work, the besiegers must possess themselves of it by carrying on lodgments which shall occupy its whole extent; and if there be any occasion to erect batteries within, in order to batter the bastion in breach, they are to be erected along its counterscarp, as may be seen in z (*ibid*).

Sometimes it shall happen, that the ground of the inside of the horn-work will not permit lodgments to be extended there, as they are ranged in this figure, because it may be too wet and marshy, or else of too narrow a circumference. In that case there is no carrying on the lodgments but along the parapet of the front of this work, and along its branches, if the breadth of the platform of the rampart of these branches will permit. It must be made to defile by frequent zig-zags or turnings; but if it be too narrow, the only way for the besiegers is to sink very deep, in order to defile from the fire of the place, and to cover themselves by traverses made very near one another.

Explanation of Plate DXXXV. fig. 5.

a, Cavaliers of the trenches. b, Batteries of stone mortars. c, Batteries to breach the half-moon before the horn-work. d, Batteries against the defence of this half-moon. e, Passages over the ditch before this half-moon. f, Lodgments in it. g, Batteries against the flanks of the horn-work. h, Batteries to breach the half bastions of the horn-work. i, Batteries against its curtain. l, Lodgments in the half bastions and in the horn-work. m, Passages over the ditch before the retrenchments in the horn-work. n, Lodgments in these retrenchments. o, Batteries against the defences of the collateral half-moons. p, Batteries to breach these half-moons. q, Passages over the ditch before these works. r, Lodgments in the same. s, Batteries to breach the reduits of the half-moons. t, Passages over the ditch

Of Sieges. ditch before the redouts. *u*, Lodgments in the redouts. *x*, Bridge of fascines, or a road to carry the cannon to the horn-work. *y*, Batteries against the defences of the bastion A. *z*, Batteries to breach this bastion. B, Passages over its ditch. C, Lodgments in the bastion A. D, Lodgments on the border of the ditch before the retrenchment of the bastion A. E, Passages over the ditch before this retrenchment.

Plate DXXXVII. represents the plan of the lodgments made in the horn and crown work of Philipsburg in 1734.

A great deal more might be said in regard to all these articles; but for the particulars, we refer the reader to the Memoirs of M. de Vauban, which display the whole extent of genius of that great man, and show how capable he was of finding out expedients for surmounting all obstacles arising either from soil, situation, or different manners of fortifying.

§ 19. *To prevent succours from being thrown into a town besieged.*

NOT to interrupt the thread of the usual operations of a siege, we have supposed that the general had taken every necessary measure to guard against all the attempts of the enemy, and to secure success by the great superiority of his forces. Sometimes, however, it may happen, that an enemy who was looked upon as too weak to relieve the place, shall prepare to attack the army of the besiegers, either in consequence of drawing out most of the troops from the neighbouring garrisons, which are least exposed, or of having been reinforced from some other part. In such case, there are two ways to follow. The first is, to wait for the enemy in the lines, and to hinder them from breaking through: the second, to leave part of the army in the lines, in order to carry on the siege, and to oppose any sallies of the garrison; with the other to go and meet the enemy, and fight them out of the lines.

Both these ways are supported by the opinion of different generals; but the latter seems to have the most general approbation.

The inconvenience of waiting for the enemy in the lines, is the uncertainty on which side he intends to direct the attack; for which reason the besiegers are obliged to be equally strong in all their posts; and when the line is very extensive, the troops are at too great a distance from one another, to make any considerable resistance on the side where the enemy forms his attack. Most lines of circumvallation, that were ever attacked, have been forced; so that both reason and experience seem to establish it as a maxim, that it is preferable to go and meet the enemy, and not to let him come within reach of the lines.

Without pretending, however, to determine so important a matter, it seems, that when a line is not very extensive, it may be defended to an advantage. And, first, it is beyond all doubt, that if the troops behind the line know how to avail themselves of the several circumstances in their favour, their situation is in many respects preferable to that of the assailants. The latter are exposed to the fire of the line for a very considerable time before they can come up to the border of the ditch. This ditch must be filled up: and all the while they are exposed to the same fire, which must kill a great many of their men, and throw their troops into some confusion. And when they break into the line, they can make but a very narrow front; for which reason, they may be charged both in front and flank by the troops within; who, if they do their duty, must drive them into the ditch. For, suppose the first line of the defendant's infantry next the ditch should be obliged to give way, the horse that are behind them may and ought to fall upon the

enemy's foot that have pierced through the line; and as the latter cannot force their way but in some confusion, the former may easily drive them out again. We may therefore conclude, that if the troops are sensible of the many advantages of a good line, and are determined to defend it; if the several parts are likewise well supported, and all the necessary precautions have been taken to prevent being surprised; it will be extremely difficult for the enemy to force it.

Thus, at the siege of Philipsburg, in 1734, prince Eugene reconnoitred the lines of circumvallation, and found them so well disposed, that he never once attacked them. They formed a kind of irregular semicircle round the place, of which the Rhine might be considered as the diameter. They were defended by a kind of fore-ditch, and by wells between this fore-ditch and the lines, as may be seen in Plate DXXIX. If the prince had attempted to pass over this ditch and these wells, he would have lost a great number of men by the fire of the lines. The wells were so near to one another, that there was no possibility of passing between them: they must have been filled up, as well as the fore-ditch, with fascines; which would have been too tedious and dangerous an enterprise.

In such a situation, therefore, the besiegers may wait quietly in their lines; but if they should be of so great an extent, as not to admit of being equally guarded, then it seems to be the safest way to draw out the troops, and meet the enemy, as marshal Tallard did at Landau, in 1703. After he had defeated the army which was marching to the relief of the place, he returned and finished the siege. The duke of Vendome acted just in the same manner at the siege of Barcelona, in 1697. Having had intelligence that the marquis of Valesco, viceroy of Catalonia, was preparing to attack him, he went out to meet that general, gained a complete victory, and returned afterwards before the place, which was obliged to capitulate.

At the same time, we must allow that the safest way to conduct a siege, is to have a good army of observation advantageously posted so as to cover the siege, and be near enough to receive succours from the troops employed before the town, should the enemy come to a resolution of giving battle.

If the enemy do not think proper to attack the besieging army, they may probably try to throw in some small succours of troops and ammunition into the town. The way to prevent them is to make the circumvallation very exact, and not to leave an opening in it, under any pretext whatsoever.

The enemy may likewise attempt the raising of the siege, by making themselves masters of the spot, or place, from whence the besiegers draw their provisions and ammunition. But before a general lay siege to a town, he should take all the necessary precautions for securing his magazines, covering his convoys, and guarding the several posts through which the enemy might march to attack him.

Another expedient the enemy may think of for raising the siege, is to attack some place of importance, which the besiegers have an interest in preserving; in order to engage them to march to its assistance, and to abandon the siege they have in hand. But this expedient ought to have been foreseen, and every precaution taken to prevent it. However, should the enemy find means to engage in an enterprise of importance, and which requires an immediate relief, if a general thinks there is not time sufficient to take the place he has laid siege to, and at the same time to oppose the enemy's designs, in that case he may raise the siege; but for so doing, there should be very cogent reasons. When king William laid siege to Namur, in 1695, marshal Villeroy, in order

Of Sieges order to divert him from his purpose, sat down before Brussels, thinking he should oblige that prince to march to its relief, and abandon his enterprise against Namur; but king William chose rather to suffer that city to be bombarded, than to relinquish a very important conquest, in which he was in a manner sure of succeeding.

SECT. II. *Of Defence.*

§ 1. *Of the Troops and Ammunition with which a fortified Town ought to be provided.*

As the goodness of the works, when a place is well provided with troops, ammunition, and provisions, is what enables it to hold out against the attack of an enemy; so the want of any one of these three articles will not permit all the advantage to be reaped that was proposed in fortifying a town. Men are properly the soul of a defence; and without them the best fortifications in the world are not able to make any great resistance against the enemy.

Therefore we must first of all lay down as a maxim, that a governor cannot make a good defence, unless he hath the number of troops necessary for defending the several posts, and obliging the enemy to pay dear for them. Immense sums are expended in fortifying a place, in order to stop a strong army with a small force: but what resistance can the place make without exerting a brisk fire; and what will those heaps of walls avail, if they are not defended? The garrison of a town besieged ought to have a reasonable stock of provisions, in order to support themselves under the fatigue of military duty; they ought also to have powder, arms, and generally every thing that is requisite to annoy the enemy, and to stop the progress of their operations.

It is not very easy to settle the number of troops necessary to defend a town; the nature of the ground on which the place is situated, and the number of outworks, ought to determine the strength of the garrison. M. Vauban in his Memoirs reckons, that in a place regularly fortified with good bastions, half moons, and covert-ways, we should allow 500 or 600 men to each bastion: That if the town has horn-works, 600 men may be likewise assigned to each of these; and in proportion for the other outworks, according to the relation which their defence may require to that of the horn-work; and the horse should be the tenth part of the number of the infantry.

This being premised, suppose a place has six bastions, there must be a garrison of six times six hundred foot, which makes 3600, and the tenth part of that number in horse, which makes 360. Hence a sufficient garrison for such a place will be 3960 men.

In order to compute, as near as possible, the quantity of ammunition and provisions that may be required for such a garrison, we must calculate how many days they will be able to maintain a siege. The following are M. Vauban's remarks on this subject.

For the investing the place and the tracing the lines	Days.
For the opening of the trenches to the attack of the covert-way	4
For the attack and taking of the covert-way, and making lodgments in it	9
For the descent and passage over the ditch before the half-moon	4
For fixing the miners, or for the batteries till the making of a reasonable breach	3
	4

Carry over

24.

Brought over	24
For taking and securing the interior part of the half-moon	3
For the passage over the great ditch before the two bastions, supposed to be begun before the taking of the half-moon	4
For fixing the miners, or erecting batteries on the covert-way, to lay the place open and make a reasonable breach	4
For the defence and support of the breach after the place is laid open	2
For the mistakes which the enemy may happen to commit, and their neglect in their works	4

Total of the defence 41

In this defence it is plain we suppose a town to be fortified only with half-moons and a covert-way; but if the half-moon had a reduit with a revetement and rampart, it might hold out four days longer. If there were retrenchments in the bastions, they might retard the taking of the place five or six days. If the ditch was strengthened with tenailles and caponiers, the passage over it might be protracted two or three days. If there was a good horn-work, or some other like fortification properly strengthened with a half-moon, a covert-way, and retrenchments within the work, the taking of it would cost about 12 or 14 days. If this work had tenailles, the passage over its ditch would be later by two or three days. If there was a fore-ditch and a second covert-way, the progress of the attacks would still be less rapid, and we might reckon 10 or 12 days for the taking of this second covert-way and the passage over its ditch. If there were redoubts near the place, they would still protract the taking of it for some days.

From this estimate, though not very exact, an idea may be formed of the duration of a siege: a point absolutely necessary for securing, at least, a sufficient quantity of ammunition during the time; we say at least, because it is always prudent, if possible, to have a greater quantity of ammunition than is supposed to be wanted. When once the number of the garrison, together with the duration of the siege, is fixed, it is then very easy to calculate the quantity of powder and ammunition with which the place is to be provided.

It is judged, that to be well provided with cannon, eight pieces should be allowed to each bastion. Therefore in a place of six bastions there ought to be 48 pieces.

As a town is never attacked on all sides, and there are seldom above two or three attacks at the most, the cannon belonging to those bastions that are not attacked, serve to strengthen the bastions attacked, and they are placed also in the outworks of the fronts attacked.

Among the cannon for the defence of the town there should be some of 24, of 16, of 12, of 8, and of 4 pounders, and even of 2 and 1. The latter are of very great service, because of their being so convenient to remove with ease, and with few men, from one place to another; for this disturbs the enemy, who find it difficult to destroy these small pieces. The largest serve to fire against their batteries and their works. The small ones are carried to the outworks, and to the covert-way, from whence they are fired *en barbette*. It is customary to make use of sea carriages for these small pieces.

Besides cannon, the town ought to be provided with a great number of wall guns, carabines, muskets, &c. We are to suppose that most of the ordinary arms will be broke in the service, and therefore care must be taken to provide new ones when wanted.

The number of mortars necessary may be estimated at 5. G. two

Of Sieges. two to every bastion. They must be of different bores, of 12 and 8 inches diameter. There ought also to be several stone-mortars.

The garrison of a place of six bastions, consisting, as we have already observed, of 3600 foot, are to be employed or distributed in the following manner.

We should, first of all, reckon about 600 soldiers wounded and sick, in the first 12 or 15 days of the siege, and for the service of the batteries, the removing of ammunition, &c. And then there will remain 3000 for the defence of the place.

These are to be divided into three equal bodies; one for the guard, the other for the bivouac under arms, ready to march on the first notice where wanted, and the third to rest.

The horse are also divided into three bodies like the foot; that for the guard is chiefly placed on the right and left of the attack; that for the bivouac is generally quartered by brigades, in different parts of the town, where they may be of service, either to keep the inhabitants in awe, or to be ready to act in sallies. In regard to the third corps, who are to rest, their horses must be saddled in the day; and the horse or dragoons must be ready to mount instantly, should there be any occasion for their service.

The guard of infantry and the bivouac ought to be under arms, at the several posts assigned them in the works of the place; and for the corps at rest, they must be ready to support the troops on guard, in case these should have need of their assistance.

The guard of foot of 1000 men may be subdivided nearly into three equal bodies; two of which to defend the posts attacked, and the third the other posts not attacked. And in regard to the two first, they may be subdivided also into three equal bodies; two of which are to fire the first two hours of the night, the other is to relieve one of them at the end of that time, the next is relieved two hours after; and so on alternately, that there may be always two thirds of this guard in action, and the other third at rest.

There is no occasion for so brisk a firing by day as by night; because the besieged are more capable of seeing what the enemy are about, and of opposing their attempts; but in the night nothing but a strong cannonading can guard against their enterprises. By day the troops fire from between baskets, sand-bags, or gabions, placed on the upper part of the parapet, to the end that being under cover they may take better aim at the enemy.

As the most perfect fortifications cannot hold out long without the necessary ammunitions, too much care cannot be taken in regard to this article.

"The ancients, says Mr Folard, were accustomed to lay in a great store of provisions, when a place was threatened with a siege; a store sufficient not only for three or four months, but for three or four years at least. This they were induced to do for two reasons; the fear of being blockaded; and the inviolable law of defending themselves to the last extremity. The moderns take less precaution in respect to provisions, as well as to every thing else; they think it sufficient to lay in a stock for three or four months in towns of the greatest strength and importance; which is very wrong. I grant, indeed (continues Mr Folard), that the law of holding out to the very last extremity is looked upon as chimerical at present, and entirely left to the ancients; but it should be considered, that an enemy well acquainted with the state of things will measure the strength of the place by the quantity of provisions contained therein; and making a calculation of the loss of men in the attack, together with the expence of a long siege, they will

choose, if they are wise (and certainly they will gain by it in the end), to take it rather by blockade than by a siege in form: at least they will be sure of becoming masters of it in three or four months through want of provisions; whereas a siege may last that time, if the garrison are obstinate. Such a town as Lille in Flanders, and as Bergues, both of which are out of the line of communication of our frontier, cannot be too well stocked with provisions. A wise and experienced minister will victual them at least for eighteen months, because they may be blockaded. It is much the same in regard to Strasburg and to Landau. The latter was never victualled for more than three or four months: how imprudent, therefore, must it be to lay siege to it, when it may be taken by a blockade almost as soon as by a siege, which is attended moreover with an infinite loss of brave men, and a monstrous expence?"

These reflections of M. Folard are very solid; but circumstances will not always permit a place to be so well provided as one could wish.

When a governor finds that the enemy threatens to lay siege to a town under his care, and that the place is in want of the chief things necessary for a vigorous defence, he is to exert all his abilities, in order to remedy this inconvenience as much as possible. The greatest want of all is that of provisions; he must therefore endeavour to get a supply, both from the country and from the people of the town; which is to be distributed among the garrison with the greatest economy. The useless mouths should be all sent out, and an inquiry ought to be made after those who are suspected of having hoarded any corn; and upon paying them for it, or upon giving them security of payment, they should be obliged to deliver it up for the subsistence of the garrison.

Hitherto we have made no mention of the inhabitants; yet they may be rendered serviceable in contributing to ease the garrison. The governor should make use of such workmen who exercise handicraft trades for every thing relating to their respective branches; and those who are not artificers, should watch the fire that may be kindled by the shells and red-hot bullets; they ought likewise to transport the materials to the places assigned them; and even to work at the different retrenchments which the governor should think fit to order in the town, provided however that they be not too much exposed to the fire of the besiegers. An article of the greatest importance, in regard to the inhabitants, is to oblige them to lay in a stock of provisions for six months, and those that are able should be obliged to make still a greater provision, which will be a resource to the garrison when their own stock is exhausted.

§ 2. Necessary Preparations for maintaining a Siege.

WHEN a town is threatened with a siege, the governor ought not only to take care to have a plentiful stock of ammunition and provisions, but moreover he should use all the precautions requisite for retarding the enemy's approaches, and rendering them more difficult and dangerous.

He ought therefore to leave nothing in the neighbourhood that may serve to cover the enemy; he should clear the adjacent country of all houses that are within reach of cannon-shot, and fill up, if possible, the caverns or hollow ways that may be concealed, or build some redoubts and other works under the protection of the place, by which they may be enfiladed. He ought to cut down all the trees; in a word, he should prevent the enemy's having any cover within reach of the cannon of the place; he should see that the fortifications be all in a good condition, and that the covert-way be well palisaded; in fine, he should cause arrows to be built on the salient angles of the glacis.

Of Sieges. glacis. Retrenchments may also be made in the re-entering places of arms of the covert-way, by raising a parapet within them, and parallel to their faces, with a small ditch before it. Nor should the galleries for the mines be forgotten: on the contrary, they ought to be begun betimes, and carried out into the country as far as the ground will permit: and chambers should be made under all the angles of the glacis. If there are any houses within the rampart which may obstruct the defence, the governor ought to see them demolished; and nothing should be left, either within or without, which can any way be of service to the besiegers. If there are new raised troops, care should be taken to discipline them well.

The governor should also see that the hospitals be in a good condition, that the sick and wounded be taken care of, nor think it beneath his character to visit them himself, and to let the soldiers see how greatly he has their preservation at heart. This is the surest way to gain their confidence and affection, and to engage them to do their utmost towards defending the place.

As it is now the custom to throw a great number of shells into a town besieged, it is necessary to have vaulted places under ground bomb-proof, where part of the garrison not on duty may rest in safety. They are not so much wanted in large cities, where there are always different quarters secure from the enemy's shells: but a small town is in every part exposed to the bombs; so that some places under ground are absolutely necessary for the garrison to take their rest, and to prevent the troops from being continually incommoded. These subterraneous caverns are generally made in the gorges of the bastions, and sometimes under the rampart behind the curtains.

Where there are none of those subterraneous places, it will be necessary, as soon as the town is invested, to erect defences to shelter the men from the bombs; these are made of strong pieces of timber, laid sloping against the parts the least exposed, and they may be covered with thick planks laid in the same manner. The large houses should also be shored, that is, all the floors, from top to bottom, should be supported with strong upright timbers, and the upper floor covered with large beams laid across one another, and these again with earth, fascines, dung, &c. When they are thus fitted up, they may serve either for the accommodation of the troops or for hospitals, &c. But what deserves a more special care, is the powder-magazines. They ought to be bomb-proof; but as there are very few that can resist the shock of a great number of shells, they should therefore be covered with seven or eight feet thick of earth, and a layer of fascines, dung, and strong planks laid over them, so as to form a kind of roof. But if it should happen, either from their situation or height, that this cannot be done, then a range of large trees, well fastened together, must be laid over them, so as to diminish the shock of the shells. The windows of the powder-magazines should have no prospect towards the besiegers; and to prevent all accidents, nobody should be permitted to go in or out of the doors, but when the fire of the enemy is slackened.

When there are no powder-magazines in a town, it is very difficult to preserve the powder during a siege; all that can be done, is to distribute it in different places, as in cellars and caves made under the ramparts, or in gardens, &c. and to cover these places well with thick planks, earth, fascines, &c.

The mischief done by shells consists not only in demolishing the buildings on which they fall, but likewise in setting fire to most places they fall upon; and when they are followed by red-hot balls, it is very difficult to hinder the town

from being burnt. In order to remedy this evil, timely precautions should be taken, and the inhabitants employed in extinguishing the fire.

First of all, a great number of casks, filled with water, should be placed in the streets; and the soldiers and inhabitants ought to be divided into companies, to prevent the spreading of the flames. It will be proper to divide these into small bodies, and to allot different quarters to each of them, for extinguishing any fire that may happen to particular houses. By these means each corps, or company, will become answerable, in some measure, for the houses entrusted to their care, and use the utmost endeavours to preserve them. The pavements must also be taken up, and dung laid in the streets, to prevent further mischief from the bursting of the shells.

§ 3. *Of the Defence from the investing to the Attack of the Covert-way.*

WHEN the place is invested, and the besiegers begin to work upon the line of circumvallation, the governor ought not at first to fire upon the enemy's troops with the largest cannon, but with his small pieces only. For as the enemy ought to pitch their camp as near as possible to the place, provided they are out of reach of cannon-shot, they will think themselves at a sufficient distance when out of the reach of those small pieces; but as soon as they are encamped, the garrison are to give them a full volley with their great guns, which will oblige them to decamp once more, and make them lose time.

While the besiegers are constructing the lines, their engineers spare no pains to get an exact knowledge of the adjacent ground, and to reconnoitre the fortifications, that they may form the plan of attack, which they will be sure to make on the weakest side. To prevent this, M. Goulan proposes the following scheme.

As soon as the town is invested, the governor should send 200 or 300 men every night to that side which he knows to be the weakest, with orders to lie upon their faces, in the form of a semicircle, of which the palisades of the covert-way may be considered as the diameter. These men should be divided into small parties, of three or four men each, at the distance of 20 or 30 paces from one another, so as to occupy a large tract of ground. All these different parties ought to agree upon a signal, to give notice when any body passes by them, and they should remain there in silence till day, without stirring, unless somebody happens to pass by; in which case, the first that sees them should rise, and give the signal to the rest, who are to do the same; then all drawing close together, and advancing to the palisades, they will take those who passed, as it were in a net, without any possibility of relief from their escort, who cannot be numerous enough to rescue them from the hands of 200 or 300 men, protected by the fire of the covert-way. If the men who advance to reconnoitre the place, instead of passing through the intervals, should fall in with some of these parties, and endeavour to get off, they must be fired upon: thus the enemy may be easily hindered from reconnoitering, and thereby acquiring a knowledge of the ground, or the side most proper to be attacked.

From the time the place is invested, the besieged should send every night small parties of eight or ten men, commanded by a serjeant, with orders to lie upon their faces all round the border of the glacis, and to listen carefully to every thing that passes. Whatever care the besiegers may take to open the trenches in silence, still it will be very difficult for this operation to be made, without such a motion as must be heard or perceived from the neighbourhood of the glacis. These small parties may even advance a little

Of Sieges. further, observing silence, and taking care not to be surprised by the parties which the enemy also may send out on that side, to watch whether there are any troops of the garrison ready to fall upon the workmen.

When the side on which the enemy open their trenches is known, the great pieces of ordnance are mounted on the rampart of the town *en barbette*, and the small ones on the covert-way, from whence they are to fire briskly upon the trenches. And to point more exactly, fire-balls are thrown from the mortars, which will give light enough to discover the workmen. Just at this time, the besieged should make the greatest fire against the enemy, because it is then they are most uncovered, and consequently most exposed. As the besieged cannot have their batteries ready till the second or third day after the opening of the trenches, during that time the guns may continue to fire *en barbette*; but it will hardly be possible to fire in that manner when the enemy's batteries are once erected. Mortars should likewise be used for throwing shells on the workmen and those employed on the batteries; in short, the best use should be made of the artillery, before the enemy are in a condition to silence it.

It is customary to make two or three attacks in order to divide the attention of the garrison; and of these, generally speaking, there is only one real: they must therefore endeavour to find out this real attack, and to use the utmost diligence in making good retrenchments, as well in the outworks, which the enemy must take before they can come to the body of the place, as in the gorge of the bastion of the front attacked. But to render these retrenchments strong and firm, they should have been begun and even finished before the opening of the trenches. A governor, who has a proper knowledge of fortification, ought to judge on which side a town is most accessible, and to presume that here the enemy will commence their attack; consequently he ought to think of every method of defence, the best adapted to retard the approaches, and dispute every inch of ground.

The besieged should so dispose their artillery at the beginning of a siege, as to enfilade the branches, and to direct their fire against the head of the trenches or the saps. This must be their principal effort; for it is by continually firing upon them that they may reasonably hope to retard the works.

When the enemy have erected their batteries, it is very difficult for the besieged to maintain theirs, especially if they are placed on the produced faces of the pieces attacked. For as the cannon are continually firing *à ricochet* against these faces, and it being difficult to guard against this firing, it will be very dangerous for the soldiers to remain there: all that can be done is to make some traverses, in order to diminish their effect; which is difficult indeed to compass, because the shot falling upon the traverses will bound between them. It is advisable not to persist in firing always from the same place against the enemy's batteries. By ceasing to fire from that part where the besiegers know there was a battery, they may be induced to think they have destroyed it, which will prevent their continuing to fire against it, and be a means of preserving the battery for future service. But in order to give them trouble, smaller guns may be placed in the outworks, on the faces of the bastions, from whence the trenches and batteries of the besiegers can be discovered; and they must often change place to perplex the enemy, who will find it very difficult to dismount those moving pieces. The besieged however must endeavour to repair the parapets destroyed by the enemy, and to take proper measures for firing again from thence, as soon as the besiegers have shifted their guns.

It is also advisable that the batteries of the besieged

should not fire in salvos, or all at a time: for it is well known, that the besiegers place soldiers in the trenches to observe, through small loop-holes made with sand-bags in the parapet of the trench, when the batteries of the town are fired, and to give notice to those who are at work in the trenches, which way the guns are pointed, that they may put themselves under cover. If the besieged have only six pieces on a battery, and they fire them all at a time, the enemy have some moments of security to look over the parapet and to examine the ground where they intend to work and to conduct the trenches: but when the garrison vary their manner of firing, they give more uneasiness to those who are at work in the trenches, who will not be so ready to look over the parapet; which, though it be necessary, in order to view the situation of the ground towards which the works are to be directed, is ever dangerous, but especially when the trenches are brought within musket-shot of the place.

§ 4. *Of Sallies.*

A GARRISON that keeps within a place, without making sallies, is, as the chevalier de Ville says, like those who are not concerned when their neighbour's house is on fire, and will not stir to extinguish it till it has reached their own. And indeed, as the besiegers continually carry on their approaches towards the town, it is of the utmost importance to endeavour, in time, to stop their progress; to which end, the making of sallies is extremely conducive, especially when they are well conducted, otherwise they would rather accelerate than retard the taking of the place.

How great soever the advantage of sallies may be, they are proper only when a garrison is numerous. A small garrison, although well stocked with all the kinds of necessary ammunitions for making a defence, and for holding out, ought to be very careful how they venture to make a sally. But a numerous garrison, not so well provided, ought to fatigue the enemy as much as possible by frequent sallies. The same measure ought to be followed when a town is but ill fortified; the garrison should not shut themselves up so as to be obliged to surrender, as it were, without making much resistance. It is best in those cases to harass the enemy continually, to keep them at a distance as long as possible, and to use every stratagem and endeavour that may retard their approaching the glacis, and the taking of the covert-way. Thus it was that the marquis of Uxelles, afterwards marshal of France, behaved at the siege of Mentz in 1689. He defended that large and ill fortified town upwards of two months, with the help of a very brave garrison; but was obliged to capitulate for want of powder and ammunition, though he was still master of the covert-way, and even in some measure of the glacis.

When the besiegers are at a distance from the place, sallies are very dangerous, because the enemy may cut them off from the town with their horse: but when they have made their second parallel, and advanced the branches of the trenches towards the third parallel at the foot of the glacis, then is the time for the garrison to sally. They may even venture, though with great caution, when the besiegers are at work upon the second parallel, and before it is entirely finished; but the most favourable opportunity of sallying, is when the besiegers are come to the third parallel, and want to make a lodgment on the glacis. Then there is no danger of being cut off; and the enemy may be surprised the more easily, as the garrison have it in their power to fall upon them all at once, and to throw them into confusion, without giving them time to recover themselves.

Sallies may be either great or small; the former ought

WAR.
Attack of Fortified Places.

Plate. DXXXIV.

Fig. 1.

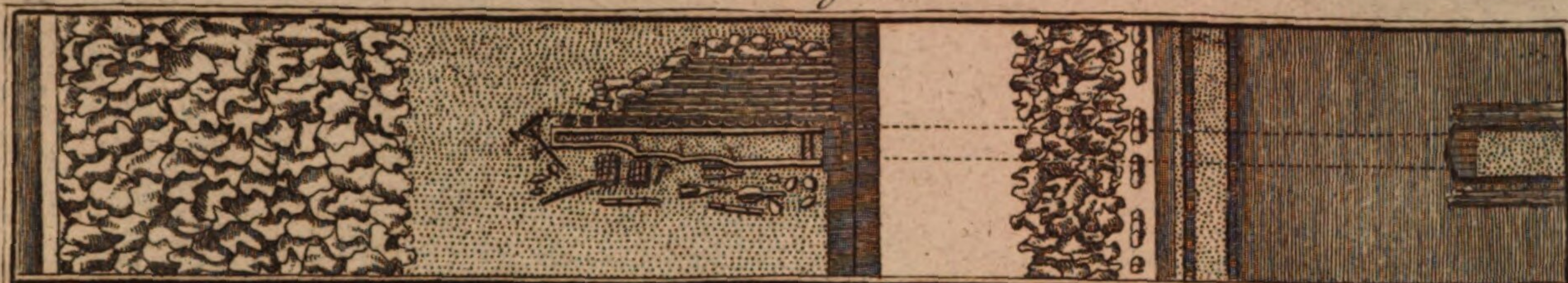


Fig. 2.



Opening of the descent into the dry Ditch viewed from the Country

Entrance into the descent of a dry Ditch viewed from the top of the Breach

Fig. 3.



Fig. 4.

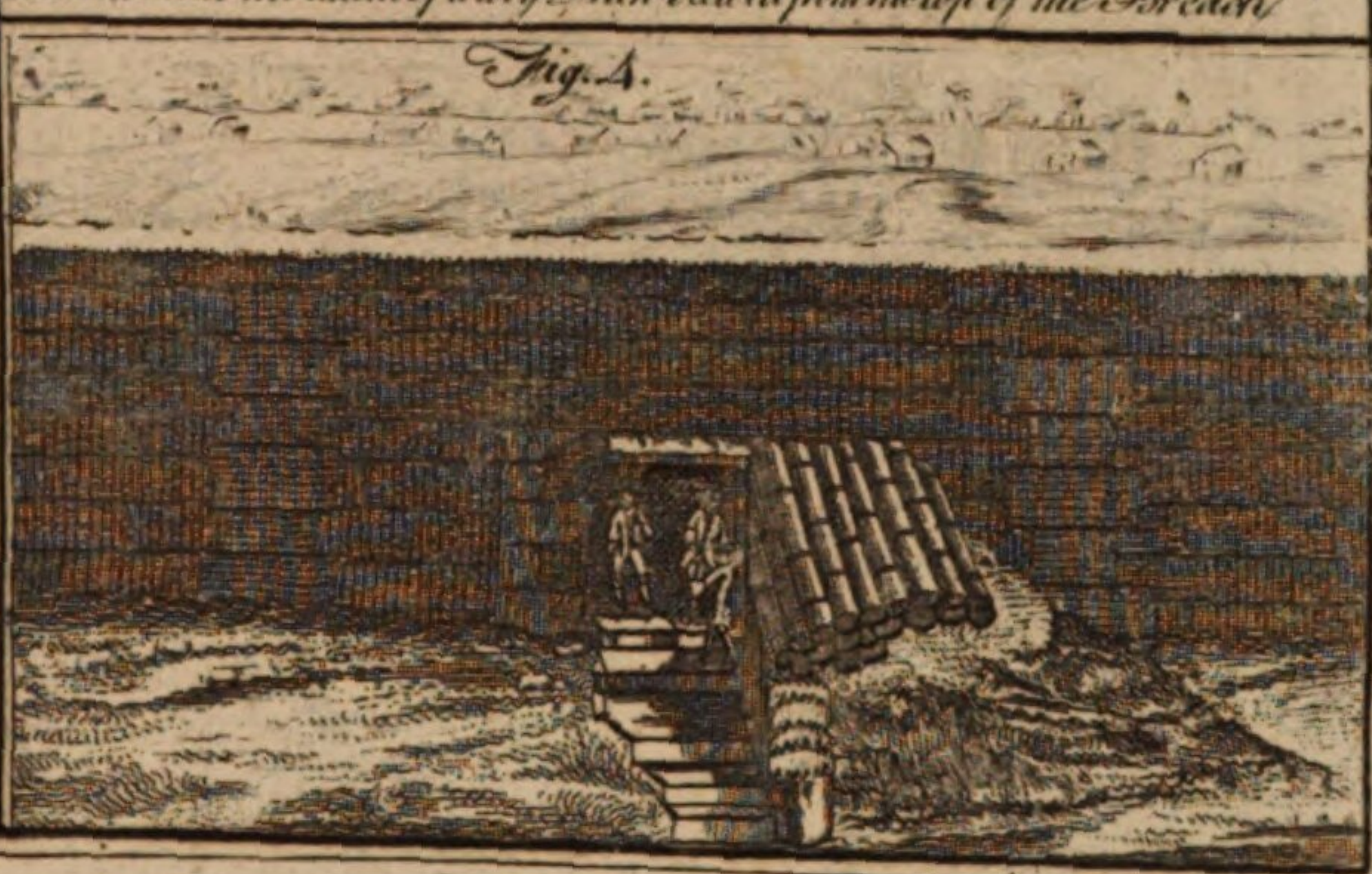
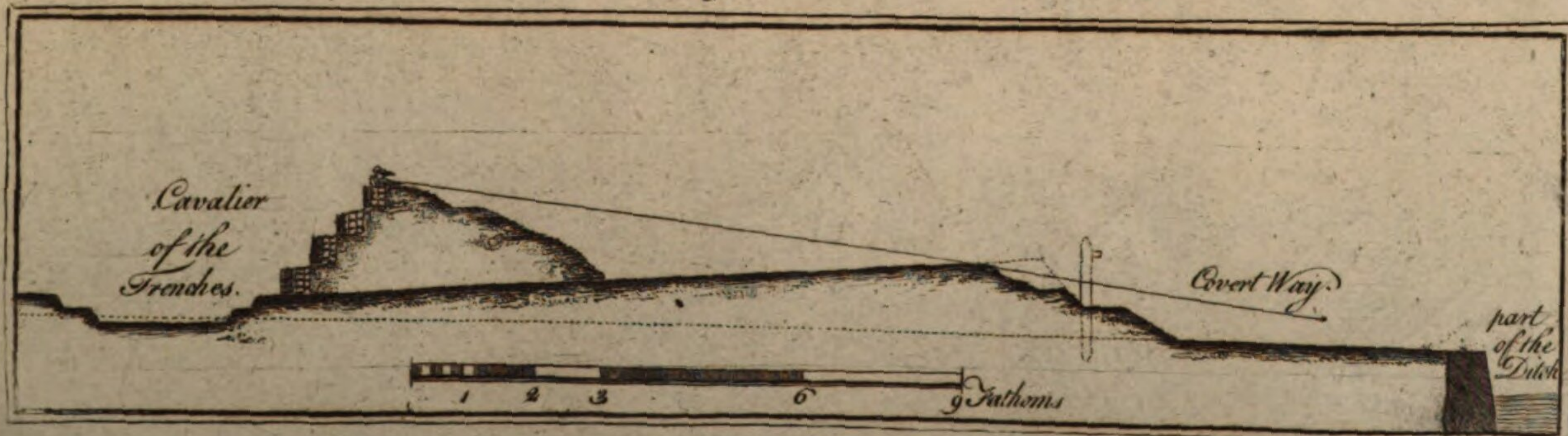


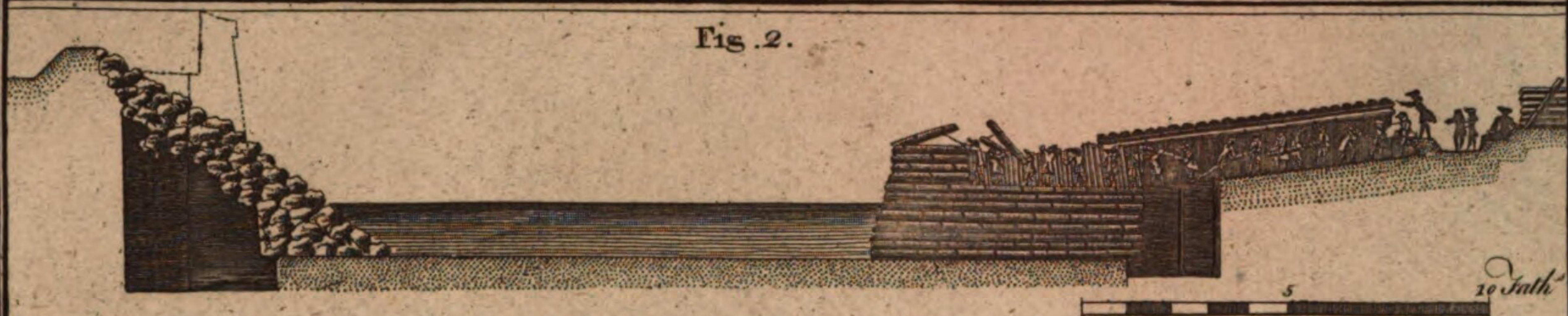
Fig. 5.



A. Bell Prin. Wals. Sculptor fecit



Fig. 2.



Opening of the descent into a wet ditch viewed from the Glacis.

Entrance into the descent of the wet ditch viewed from the Breach



Fig. 3.

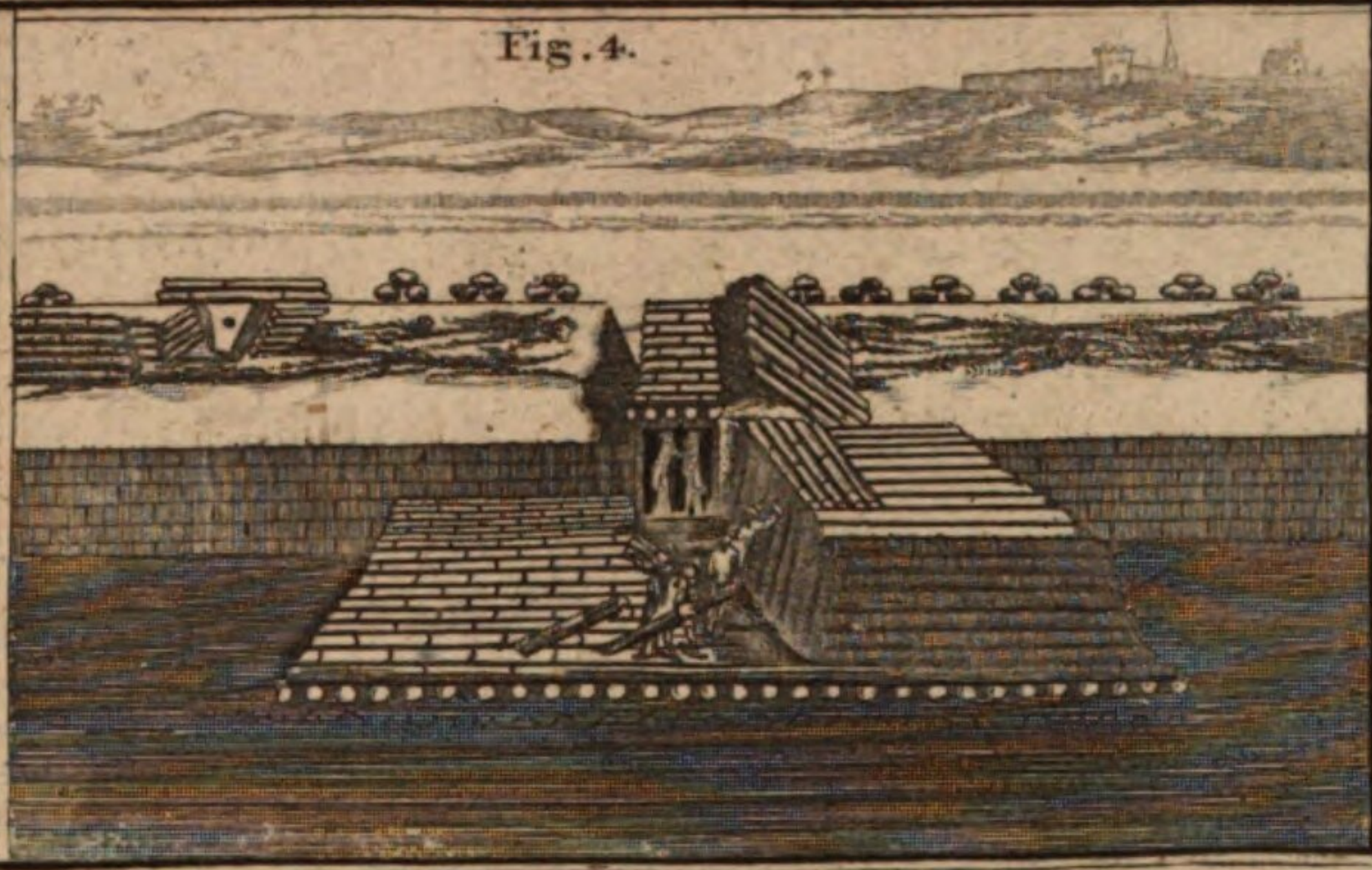
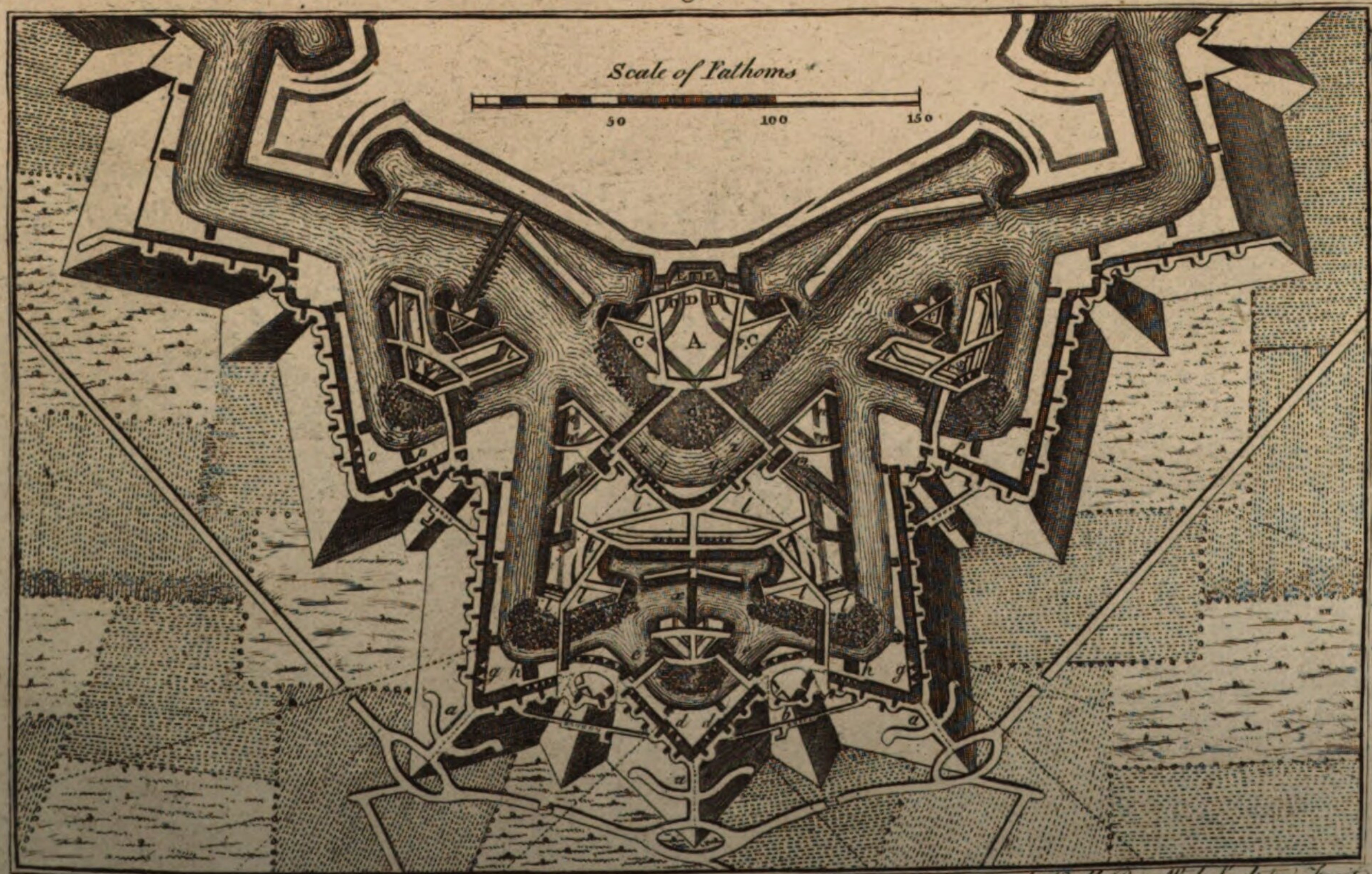


Fig. 4.

Fig. 5.

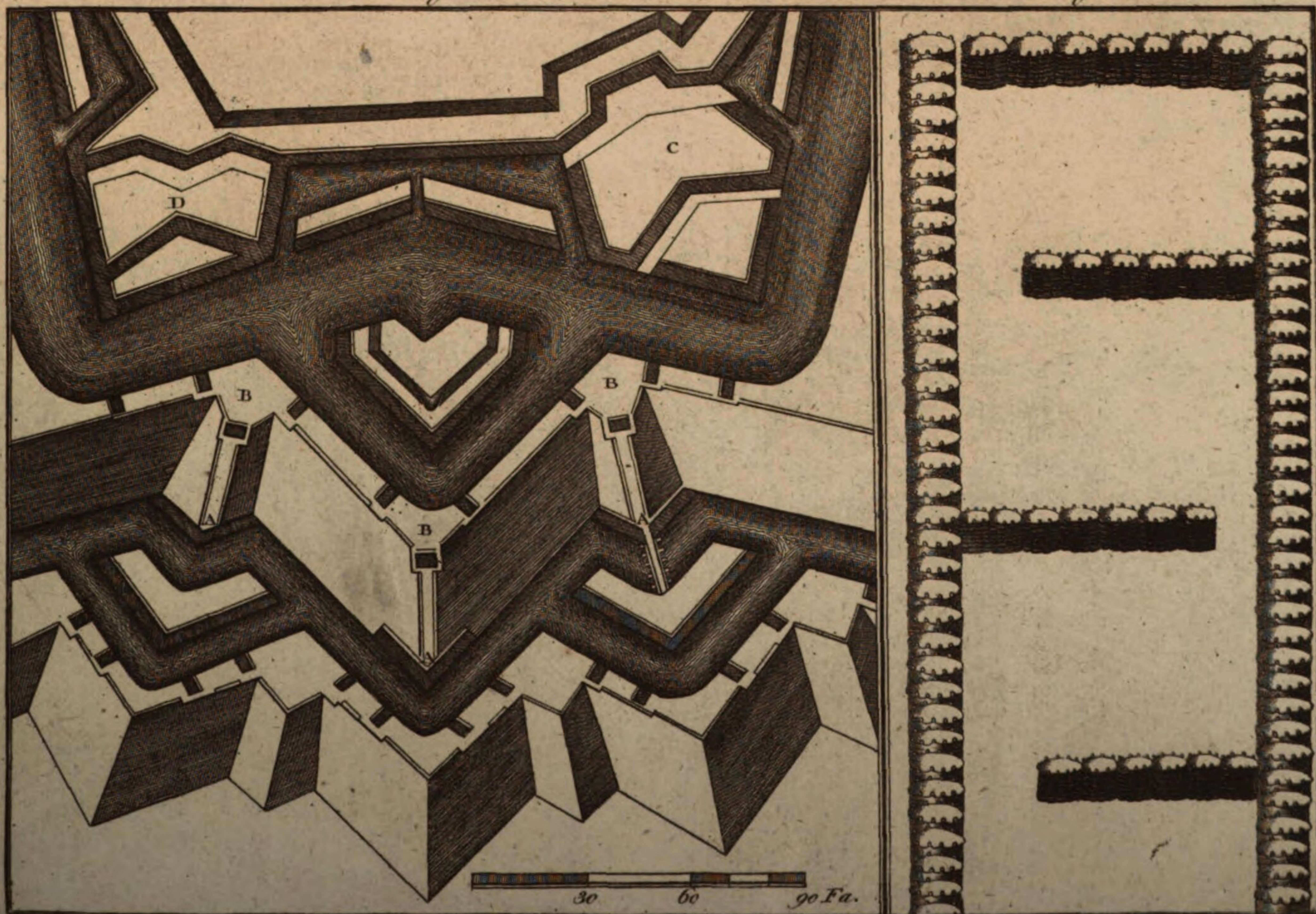


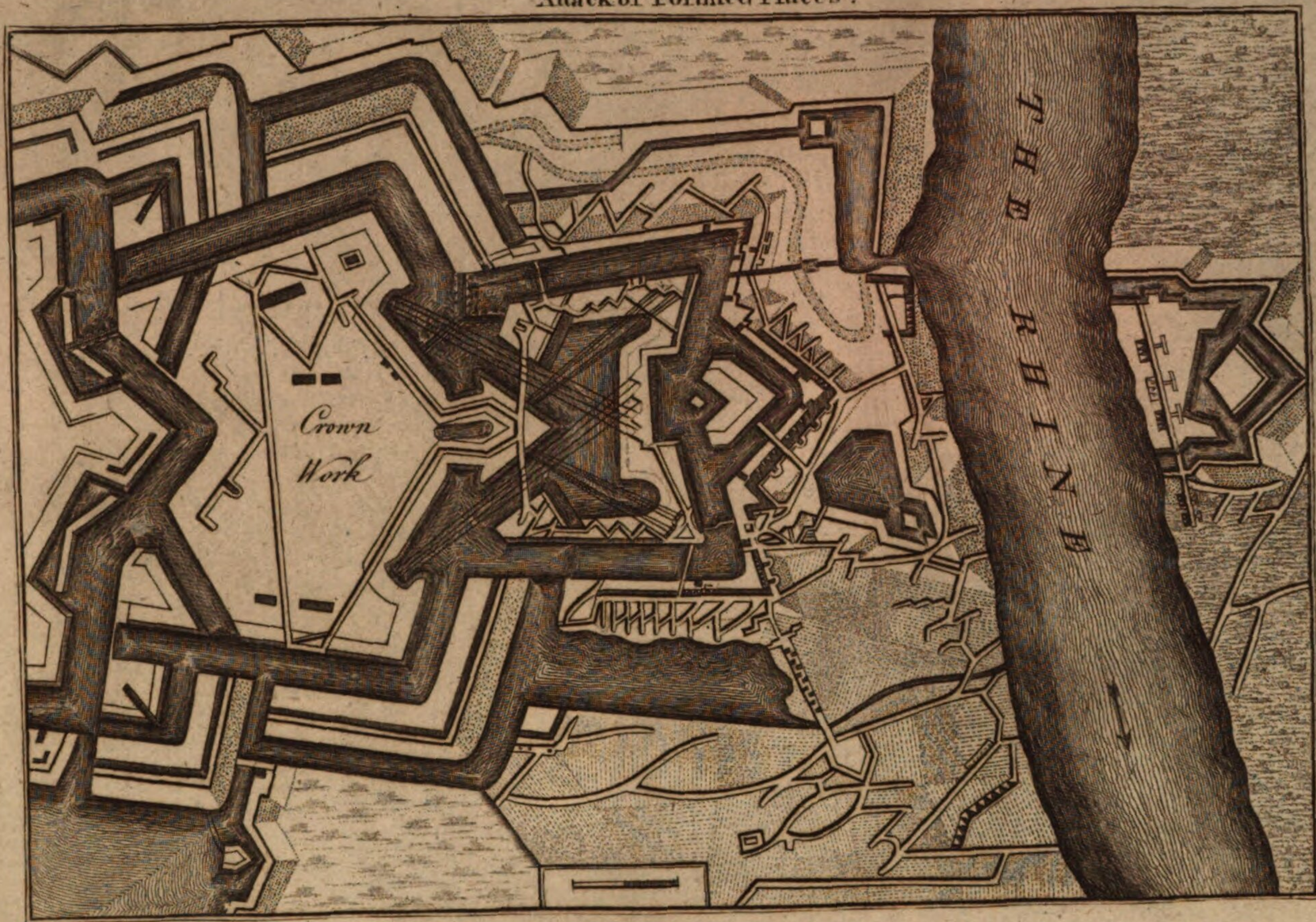
Scale of Fathoms



Fig. 2.

Fig. 3.





WATCH Work.

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

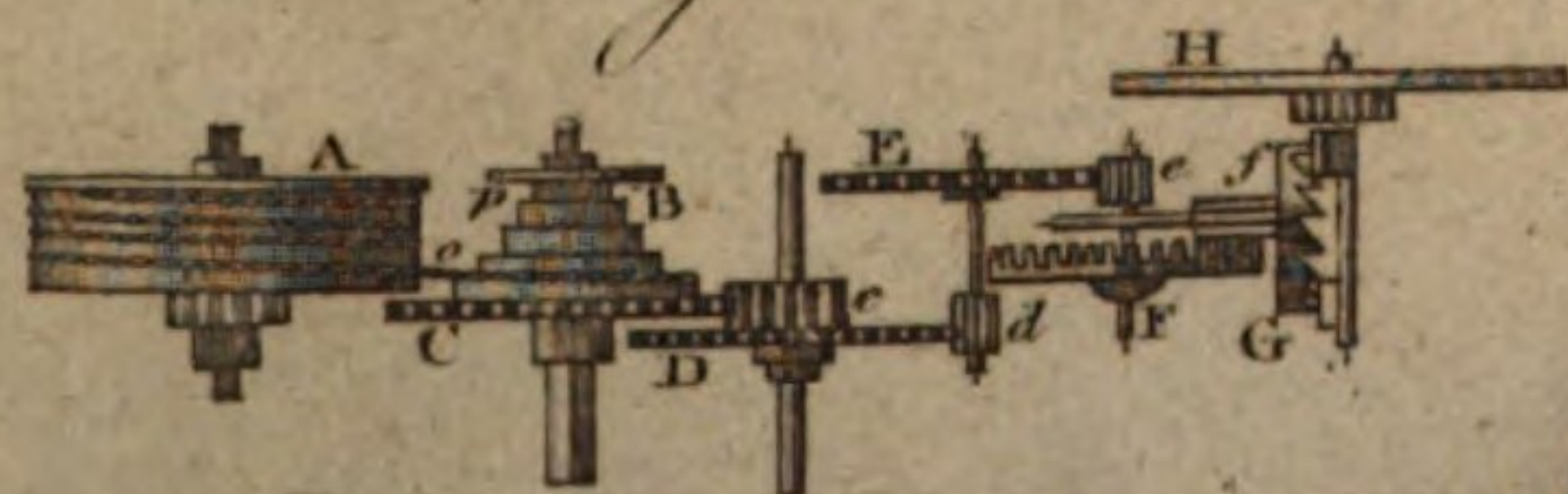


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.

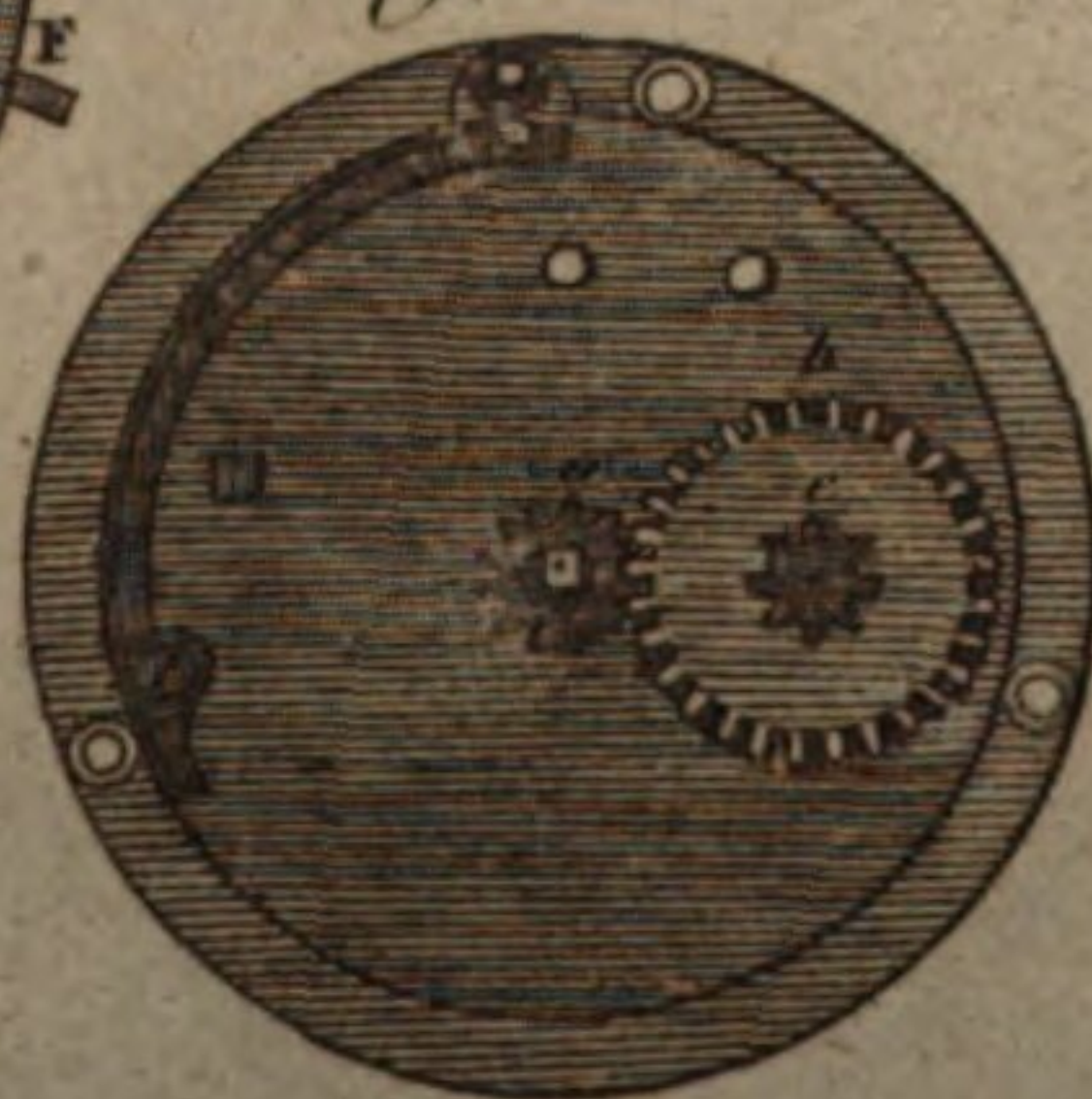


Fig. 11.



Of Sieges. to be with 500 or 600 men at least, or proportioned to the guard in the trenches; the latter are only with 10, 15, or 20 men.

The intent of great sallies should be to destroy a considerable part of the works of the besiegers, in order to oblige them to begin again; to nail up their guns; to retake some post which had been abandoned; and lastly, to obstruct the enemy's works as much as possible, and thereby retard the taking of the place.

In regard to small sallies, they serve for no other end than to interrupt the workmen at the head of the trenches, so as to frighten them, and oblige them to run away. As it requires some time to bring them back, and to make them return to their work, this will occasion delay, and retard the approaches.

The best time for great sallies, is two hours before daylight, the troops being then fatigued and sleepy; therefore more easily surprised, and less capable of making a vigorous resistance. And when it has rained very hard in the night, so that the guard in the trenches may be unable to make use of their fire arms, this is also a favourable circumstance: in short, no opportunity should be neglected to surprise the enemy; for sallies seldom prove advantageous any other way. The following is the order which M. Vauban proposes to be observed.

There should be a detachment of 90 men drawn up, 30 in front, and three deep; to which must be added a fourth rank of 30 grenadiers. The three first ranks of this detachment should be armed with cuirasses; each soldier should have a sword and pistol at his belt, and a partizan, or long iron fork with a hook, in his hand. This detachment is to be followed by another of 180 men, 30 in front, and six deep; the first rank of these is to be armed as the former, with cuirasses and long weapons, the rest as usual. The first rank in this detachment is to make up the rear in the retreat. After this second detachment 200 workmen are to follow with proper tools to destroy the enemy's works, and several of these with combustibles to burn what they cannot otherwise destroy. Some of them are to be provided with long nails of steel, and of different magnitude, to spike the cannon; there must be some of a very large size, because the touch-holes happen frequently to be so very wide, that common nails will not fill them up exactly.

Besides the two detachments and workmen above mentioned, another body of 300 or 400 men should be ordered to support them, and to follow them slowly as far as the head of the trenches; where, if they find that those who went before them have no need of assistance, they should halt to be ready to act if occasion requires it. If the guard of the trenches should make a vigorous attack upon the sally, this detachment will support them, and jointly encounter the besiegers. If the latter are repulsed, which must be the case if the sally is not foreseen and expected, the workmen must set about demolishing the works, and filling up the trenches as fast as possible. These troops should also endeavour to penetrate as far as the batteries, in order to nail up the cannon, and to maintain themselves in the trenches long enough for the workmen to destroy great part of them. When they have done what they proposed, they retreat to the covert-way in good order; and if the enemy should be so imprudent as to pursue them as far as the glacis, they must be received with a brisk fire as well from the cannon of the ramparts as from the troops in the covert-way.

In sallies, and generally in all actions performed by night, the soldiers should put something in their hats, as a white paper or handkerchief, to know one another in the dark. The troops designed for this purpose are drawn up in the place of arms within the town, or in the ditch if it be dry,

or else in the covert-way. When they are to march out by different gates, some signal should be agreed upon, that they may all move at the same time. If there are more attacks than one against the town, as generally is the case, then several sallies may be made at the same time upon these attacks. It might be proper to make a great noise on one side, in order to draw all the attention of the enemy that way; and while they are busy in the repulse, to act vigorously on the other side; for then they will meet with less resistance, and will be more capable of hurting the besiegers. However, as a sally which has not all the success that might be expected, ought not to discourage the garrison from repeating the attempt; so one that has been crowned with success ought not to render them too confident, or inspire them with too great a contempt for the enemy. The mistakes the latter may have committed, will rouse their attention, and put them upon their guard. We ought ever to suppose, that they will do all that we should do, were we in their place, and that they will take proper measures to remove every obstacle that may oppose them.

Hitherto we have taken no notice of the use of cavalry in sallies; and yet on some occasions they may be of service, which is when the besiegers are at a distance from the place. In this case, two detachments of horse are ordered to the right and left to support the sallies, and to hinder the enemy's horse from falling upon them. These detachments serve also to protect their retreat, and to prevent their being cut off; but when the besiegers have finished their third parallel, the sallies are then made with foot only, and should, as we have above observed, be often repeated, provided the garrison is numerous enough to dispute every inch of ground with the enemy.

As soon as the troops are returned from the sally, fire-balls should be thrown into the trenches, to discover the workmen who are employed in repairing the mischief that has been done, and are at that time in some measure uncovered. The fire of the place well served at this juncture, must kill a great many of the enemy. So far relates to great sallies.

The small sallies, which are intended merely to disturb the besiegers without being able to do them much hurt, are conducted in the manner following. The governor orders out parties of 10, 15, or 20 stout men only, as hath been already observed, who are to advance softly to the head of the trenches, and to jump into them quickly, making a great noise, and throwing grenades; after which they are to retire with all expedition: the alarm which they will occasion is sufficient to make the workmen take to their heels, who desire nothing better than to have a specious pretence, as M. Goulon observes, to run away upon the least alarm; and it is impossible to prevent it, or to bring them back the same night; so that the besiegers must lose all this time. If, says the same author, the besiegers become accustomed to these little sallies, so as to grow secure and take no notice of them, the besieged observing this must make one in good earnest, which coming unexpected, will easily overturn the workmen and the troops that cover them: after which they may retire without fighting, lest they should draw the whole guard of the trenches upon their backs.

§ 5. *Of the Defence of the Glacis and the Covert-way.*

BESIDES the sallies which retard the lodgment of the besiegers on the glacis, mines may increase the difficulty of approaching. We have already taken notice of these in the section of *Attack*; we have only to observe here in general, that the besieged must make the best use of them possible, in order to blow up the enemy as often as the ground will permit;

permit; this is the surest way to keep the besiegers in awe, and to oblige them to advance with the greatest circumspection.

Besides the galleries and mines which ought to be under the glacis, the besieged may also lay opposite to its angles large planks, stuck full of very long nails, with the points upwards, to incommode the enemy in passing over the glacis. These planks ought to be strongly fixed, to prevent their being easily taken away. The burying of caissons in the glacis is also productive of a good effect; but they ought never to be placed nearer than six or eight feet to the inside of the covert-way, lest they should do any damage to the troops that defend this post.

When the enemy endeavour to make a lodgment on the glacis, the garrison must repeat their sallies with greater vigour; which may be done without any inconvenience, because of the facility of retreating. When the troops are returned from the sally, fire is set to the chambers and caissons, which will greatly disconcert the besiegers. If the chambers are well disposed, they must hurt their lodgments prodigiously; and as soon as they are sprung, the besieged may fall upon the enemy, this being a favourable opportunity for surprising them in disorder, and consequently of destroying part of their works. This manner of proceeding should be often repeated, in order to fatigue the besiegers, and to retard the taking of the covert-way.

When the enemy are ready to storm it, the garrison must prepare to give them a warm reception. The difficulty of making a lodgment in the covert-way may be increased by a double row of palisades; the second should be lower than the first, to the end that the enemy may not perceive them. These two rows ought to be at the distance of four or five feet from one another, to prevent the besiegers from jumping over them into the covert way. Between them may be made a small ditch; into which most of the enemy's grenades will fall, and cause less mischief to the troops. Care must be taken to make strong retrenchments in the places of arms, either by raising a parapet within side, and parallel to their faces, with a small ditch at the foot of it, or by simple rows of palisades, which will hinder the enemy from forcing their way so easily as they would otherwise be capable of doing. In each place of arms there should be one or two barrels of powder, with balls and small arms necessary for the defence of the covert-way.

All the batteries must be got ready to fire with the utmost briskness upon the enemy, when they are at work upon their lodgment. Every part of the place that looks into the covert-way ought to be lined with troops, who are to fire upon the besiegers; but there ought to be no troops in the parts opposite to the places of arms, that the troops posted there may not be hurt by the fire from the body of the place.

The garrison should endeavour to be informed by deserters at what time the enemy intend to make their attack; the motions of the latter may be also observed by persons posted on steeples; and as soon as the troops are perceived to make an extraordinary motion, and the trenches to be filled more than usual, this is a sign that they are going to attack. The vicinity of the enemy's works may also enable the besieged to judge of their forwardness; and all this together direct them to take such measures as are proper for giving a warm reception to the besiegers.

As soon as the garrison perceive that the enemy are marching out of their trenches, they should keep firing upon them continually with great and small arms from all the works facing the attack. This will destroy a great many of their men before they can reach the palisades: the two rows of which in the covert-way will prevent their

jumping into it directly. They will be under a necessity of breaking them successively with hatchets; and while this is doing, a general discharge is to be made from the batteries of the town, which will do great execution. When, after a vigorous resistance, the garrison find themselves hard pressed by the enemy, they may abandon the covert-way, and retire into the places of arms; and while the besiegers are working upon their lodgment, they will be exposed to the fire of the place, which takes them in front; and to that of the places of arms, by which they are taken in flank; so that their loss must increase considerably. If they have mines ready, as we suppose they have, they must spring them, after having suffered the enemy to work for some time upon their lodgments; and after having kept firing against them continually with great and small arms, then immediately they should make a strong sally from the places of arms, and taking advantage of the disorder into which the besiegers must inevitably be thrown, they will oblige them to abandon the covert-way.

If there is no possibility of hindering the enemy from making lodgments on the crest of the covert-way, or, which is the same thing, on the ridge of the glacis, the besieged must endeavour to retard them, and to dispute as long as possible their taking possession of the places of arms. On this occasion fougasses are employed with success, and should be repeated several times if the ground will permit. When the besiegers have once completed their lodgment, and supported it in a proper manner, they want nothing further than a little time to extend themselves, and to become masters of the covert-way. The obstinacy of the besieged can only retard, but not absolutely hinder, the taking of this outwork.

Let us suppose that the enemy resolve to approach the covert-way by sap, and that they have raised cavaliers in the trenches to plunge into this outwork, the besieged must strive to retard this operation by every stratagem imaginable; for when the cavaliers are once constructed, it will be very dangerous to abide any longer in the covert way. They must stop the besiegers at every step with mines; they must harass them with a constant discharge of fire-arms, and dispute every inch of ground, defending themselves behind every traverse, and in the places of arms, as well as they can, without running too great a risk of having their retreat cut off.

§ 6. *Of the Defence of the Passage over the Ditch before the Half-moon.*

THE enemy having made themselves masters of the covert-way, and perfected all their lodgments, will erect their batteries for making a breach, and prepare for the descent into the ditch. All this while the besieged must keep firing both with their great and small arms, in order to incommode the enemy in the construction of their batteries. If the ditch is dry, the soldiers may mount with ladders along the counterscarp, and from thence throw grenades into the enemy's works; and when they cover themselves in the covert way with sand-bags, gabions, &c. against the fire of the place, these very soldiers should, with great sap-hooks, pull down part of them, and afterwards jump nimbly into the ditch, leaving the enemy exposed to the fire of the town while they are putting their materials again into order. Mines may be likewise used here with great advantage; they furnish various means to harass the enemy, to obstruct their works, and to make them lose time and men.

The batteries of the besiegers being destroyed by mines made under them, must oblige them to lose a great deal of time in repairing them, and in endeavouring to make themselves masters of the mines, otherwise they can never be secure.

Of Sieges. secure. When the besieged have blown up the batteries that were to open the breach, they must make good use of the time which the enemy will spend in repairing them, and strive to perfect the retrenchments, which should have been set about at the commencement of the siege, in the gorge of the half-moon, and in those of the bastions of the front attacked.

The mines for blowing up the batteries of the covert-way may be disposed in such a manner as to tumble the guns into the ditch, as may be seen in the course of mathematics by M. Belidor, who performed it with success at the academy of La Fere.

It is certainly a great advantage thus to be able to become masters of the cannon of the besiegers, and to oblige them to erect new batteries, which must take them up a considerable time. A doubt here may arise, whether if these batteries are opposite to that part where the enemy intend to pass the ditch, this would not be helping to fill it up, should the besieged blow up the guns: but this inconvenience is of no great consequence, especially as it may easily be remedied, by clearing away the rubbish of the mine which tumbles into the ditch along with the battery.

As the besiegers work at the descent into the ditch at the same time that they are preparing their batteries, the besieged must think of retarding both these operations also at the same time. If the descent into the ditch is made under ground, miners should be employed to interrupt the work; and if the ditch is dry, small detachments, as M. Goulon observes, of five or six men, may be placed near the counterscarp, to watch the moment that the enemy break through it, and immediately to fire into the gallery: this discharge will either kill or frighten the miners; and at least will retard the works. Those who have fired, should retire on each side the opening to load their arms again, which may be repeated several times. Fire-balls and grenades may be likewise thrown into this opening, which will oblige the sappers to retreat.

If the ditch is filled with water, the same operations may likewise be performed with small boats made on purpose; and to cover these boats a kind of parapet should also be raised by means of strong boards, with holes to fire through upon the soldiers, who upon opening the gallery will throw fascines into the ditch. At the siege of Lisle, marshal Boufflers contrived some boats of this kind to retard the passage over the ditch, before the grand lunettes or tenailions in the front attacked, and that before the half-moon.

When the enemy make their opening into the dry ditch, they must be opposed with a strong fire, as well from the face of the bastion which flanks the ditch before the half-moon, as from the place of arms or traverse, which ought to be constructed the whole breadth of the ditch, in order to strengthen the defence. By night small sallies should be made from this place of arms, with a view to interrupt the passage over the ditch, and to retard, as much as possible, the fixing of the miner.

There are two ways of passing the dry ditch, and of bringing the miner to the foot of the revetement which he is to enter. The first consists in making a gallery six feet wide, with a double row of barrels. These must be filled with sand-bags, and so must the spaces between them, in order to render the passage of the gallery more safe; and that there may be a shelter from fire-works, strong planks are laid over it, and these again are covered with raw hides, or with earth and dung. This gallery is continued within three or four feet of the revetement; and in this space a good epaulement is raised with sand-bags to cover the miner on the side exposed to the place. In regard to the other side, it is of no use to stop it up; nay, it serves for an opening

to fill the ditch with the earth dug out of the galleries, which the miners are making in the rampart of the work attacked. It is easy to oppose the progress of this gallery with a continual fire, and with several lesser works constructed within the ditch.

The other way, which, as we have already seen in treating of the attack, consists only in getting to the foot of the breach by sap, with an epaulement on the side exposed to the place, may be covered, in order to protect the passage from the fire-works and grenades of the besieged. But this sap may be retarded by sallies; the besieged may likewise steal away the earth by night from the epaulements, and endeavour with hooks, &c. to displace the gabions and fascines.

If the ditch is filled with water, the besieged must interrupt the enemy's bridge with a continual fire from their great and small guns, as well as with grenades and shells, if they are in a condition to fire upon the bridge and its epaulement. If the water has a strong current, they must open sluices in order to break down the bridge, or at least to carry away the fascines. They should also attempt to set fire to it with artificial works prepared for this purpose. They may likewise approach the epaulement in the night, and draw away the fascines with hooks. They may even throw anchors upon it; and by means of capstans placed in those parts which flank the ditch, they may draw these anchors with cords fastened to them, and tumble part of the epaulement into the ditch. In short, every expedient must be tried that may possibly retard the enemy's approaches: for when once they have perfected their bridge, they will soon be masters of the outwork to which that bridge leads, whatever precaution the garrison may take to defend the breach; because, as the besiegers can always pour in fresh men to supply the room of those that are lost in the attack, they must at length surmount all opposition.

§ 7. *Of the Defence of the Half-moon.*

WHILE the enemy are effecting the passage over the ditch, besides the difficulties that are raised to retard the work, all proper precautions should be used to defend the breach, and prevent the taking of the half-moon. For this purpose guns are placed in all the works from which the breach may be seen; and they should be placed on carriages or on pieces of wood, as the garrison find most commodious, of least hinderance to the defence, and productive of the best effect.

If the half-moon has no reduit, as here we suppose it has none, the retrenchments, which ought to have been made there, must be put into good condition; a row of palisades must be placed before it, in order to stop the first fury of the enemy after they have made themselves masters of the breach; in a word, the besieged must prepare to dispute every inch of ground, and to retire from the half-moon into the town, when they find themselves hard pressed and no longer able to maintain that post.

When the enemy present themselves at the foot of the breach, a great number of grenades, and sacks filled with powder, are thrown among them, with a view to sling them into disorder. Glass or earthen bottles filled with powder, and burning matches twined round them, are capable of doing them a deal of mischief. A great quantity of loose powder may be scattered about the breach when the enemy are ready to mount to the assault; and when they are mounted, lighted matches or burning coals may be thrown among the powder to set it on fire; which will burn and disable a number of those who are in the breach. It will be proper also to throw into the breach a quantity of harrows, stuck full of large nails with the points upwards; and to prevent the

Of Sieges. the enemy from removing them, they must be fastened with chains, or with great cords. It is advisable to be provided with crows-feet, and to spread them about; as also with chevaux-de-frize, and with herissons, that shall extend the whole width of the breach (see *HERISSON*). Shells also fastened to the ends of chains, in order to confine them to that part where they may do most damage to the enemy, are an excellent contrivance. Their fuses are made shorter than usual, to the end that they may produce their effect more readily. Fascines smeared over with tar, and, in short, every stratagem ought to be tried to hinder the enemy from lodging themselves in the breach.

When the besiegers have surmounted all these obstacles, and at last have got possession of the breach, the mines are sprung in order to blow them up, and chevaux-de-frize are placed along the whole breadth of the breach. The troops post themselves behind, and continue to make a vigorous fire upon the besiegers while they are using their utmost endeavours to penetrate into the half-moon; and when they begin to force their way, the first rank of men that defend it, being armed with partisans or halberts, and supported by the other troops, ought to fall upon the enemy, and cut them in pieces. But if the besiegers at length by dint of numbers should drive the garrison from the breach, the latter ought to retire into the retrenchment, and from thence make a very brisk firing; and when they find that this is also upon the point of being forced, then they are to withdraw their cannon, and whatever ammunition they may have, into the place; and last of all, if they have any mines under that spot, they must spring them as they retire, in order to do all the mischief and to create all the confusion they can to the besiegers.

Sometimes it shall happen that the enemy, after having made themselves masters of the half-moon, omit to leave a sufficient number of troops to guard the lodgment, upon a presumption that the besieged will not attempt to retake it. Whenever they show a confidence of this kind, a strong body of the garrison should return in the night and storm this work, either by the gorge, or by some other part. There are great odds, but such a vigorous and sudden surprise will be productive of a very good effect; at least there is no great risk in trying, if the strength of the garrison will permit; and should they succeed, the taking of the town will be retarded several days.

Here we have supposed that the enemy are resolved to storm the half-moon; but if they should attempt to get possession of it by means of saps, in that case the workmen must be continually harassed by blowing up mines, and kept as long as possible from the breach by means of fire-works of all kinds. When they begin to make a lodgment in the breach, then the besieged should fall upon them briskly, and destroy the lodgment; in short, every artifice imaginable should be used to retard their progress.

This last method is less bloody than the other; but on the other hand, it may be very tedious, when the besieged spare no pains to disturb the enemy's sappers and miners.

One thing that greatly deserves attention, and may render it very difficult for the besiegers to mount to the assault, or to lodge themselves in the breach by means of saps, is to clear away the rubbish in the breach. In a dry ditch this may be easily done; but in a wet one, the thing is more difficult: on the other hand, in the latter case the breach is more easy to defend than in the former; because as the enemy cannot come to the foot of it but by the bridge of fascines, which is made in the ditch, and is seldom above 10 or 12 feet wide, they cannot of course present themselves with so large a front before the breach as in a dry ditch;

consequently the garrison must find it much easier to repel them. *Of Sieges.*

§ 8. *Of the Defence of the Passage over the Ditch before the Bastion.*

At the same time that the enemy are carrying on the attacks of the half-moon, they work at the passage over the ditch before the bastion. What has been said in regard to the defence of the ditch before the half moon, may be applied on this occasion; we have only to add, that when this ditch is dry, the caponier will be of great use to fire upon the enemy in their passage over the ditch, and to fall from thence in order to destroy their works. If the ditch be wet, it must be defended in the same manner as that before the half-moon: here only we shall add, that if there is a tenaille opposite to the curtain of the front attacked, the fire from thence will greatly annoy those who are employed in filling up the ditch. Besides, the boats by which we observed that the enemy might be incommoded in the passage over the ditch, the besieged may likewise have recourse to a kind of floats, made with double joists, at the end of which are fastened empty barrels, to prevent their sinking too deep in the water; and these floats should be loaded with shells, barrels of gunpowder, fascines, pitch and tar; and in short, with all sorts of combustibles proper for setting fire to the bridge, and to the enemy's epaulement: these are brought forward and fastened to the epaulement, and afterwards they are set on fire with a match, or with tow laid amidst the combustibles.

When there are dikes or sluices, by means of which the ditch may be filled with water at any time, every art must be tried to defend it while it is dry; and when all the defences are exhausted, then the water is let in, and the enemy will be obliged to begin their work again.

§ 9. *Of the Defence of the Bastions in the Front attacked.*

HERE the reader must recollect what has been said in regard to the defence of the breach in the half-moon. The defence of the bastions is more easy, because it is not so difficult to retreat from thence, by means of the retrenchment; and this retrenchment should be larger and more spacious than that of the half-moon, and more difficult to force.

Besides all the precautions we have been mentioning, as mines under the breaches, within the bastions, &c. the besieged should also mount several pieces of cannon on the breach, charged with cartridge-shot, and pointed downwards, so as to be able to sweep the whole surface of the ground on which the enemy must form in order to march to the assault. Care must also be taken, lest the enemy, discouraged with the difficulty of storming the breach, attempt to scale the bastion, as hath been practised several times, and particularly by the duke de Noailles, marshal of France, at the siege of Gironne, in 1712. The way to guard against this attempt, is to place along the parapet of the works that may be insulted, large pieces of timber, which are to be tumbled upon the ladders as soon as the enemy offer to mount. They should also have loaded shells all along the rampart, fastened to chains, and to let down towards the middle of the ladders, where they will burst and kill those who are mounted. They should likewise be provided with combustibles of different kinds, to throw upon the besiegers, and to keep them off from the foot of the revetement. When the garrison are well prepared against this attempt, it will be very difficult for the enemy to succeed.

The entrance of the bastion may likewise be defended, by

Of Sieges. by making a ditch in the upper part of the breach, and filling it with all sorts of combustible matter. This will form an impenetrable barrier against the enemy, at least for some days; which time is to be employed in strengthening the retrenchments, and throwing up others, one behind another, if the ground will permit, and it be resolved to defend the place to the last extremity. Though it is usual for the enemy to force their way into the town by the bastion, and therefore the principal retrenchments for defending the entrance of the place should be raised in this part; yet it is proper not to neglect the curtain. The enemy may be apprised of these retrenchments, and as it is not the practice to make any behind the curtain, they may take it into their heads to batter it in breach, and to construct a bridge in the ditch before it, in order to penetrate into the town. Thus did prince Eugene act at Lisle; as the back part of the curtain was open, the place was obliged to capitulate. The breaches may likewise be defended by repairing them with large trees laid across one another, the branches pointed towards the enemy. Cannon will make no great impression on this kind of wall; which was the principal defence of the ancients when a breach was made.

When the besiegers have triumphed over all these obstacles, so as to be masters of the breach, and to extend their lodgments on the bastion; then it is no longer possible to defer capitulating, unless there are several retrenchments one behind the other. In that case, indeed, the besieged, if they think proper, may defend themselves to the very last; but this desperate defence is very rare; because every wise governor chooses to preserve the garrison, and to save the town from being plundered, which would be the case, according to the laws of war, if it was taken by storm.

§ 10. *Of Precautions to be used against the surprising of Towns, Scalades, sudden Attacks, &c.*

THE right way to prevent surprises, is to think that the enemy have a design upon the town, and to use all the precautions possible in order to frustrate their designs. With this view a governor should put the fortifications into a good state of defence, should see that the several posts, whether accessible or inaccessible, be well guarded, that parties be sent to range in all the principal avenues of the place; in a word, he should most exactly observe whatever is prescribed in the military ordinances concerning the guard of towns, the opening and shutting of gates, &c. We shall make no mention of any of these particulars, because a very short stay in a garrison is sufficient for learning every thing that may relate to the daily and customary duty, as well for the safety of the town, as for the preserving peace and good order among the inhabitants, and for preventing any strangers or suspected persons from entering the place, &c.

We shall only observe, that when a fortress is situated upon a river, care should be taken to have boats in the night, filled with soldiers, both above and below the town, to hinder any body from getting in that way undiscovered. If the ditches are filled with water, in frosty weather the ice should be broke every day; in short, nothing should be neglected that tends to secure the place against any enterprise either from within or without.

But chiefly on fair or market days this vigilance should be exerted; the guards ought to be doubled at all the gates, and the garrison should be disposed in such a manner as to be ready to fly to their arms upon the first beat of drum: care should be also taken to make the cavalry mount on

horseback, ready to act in all events. By using these precautions, it will be very difficult for the enemy to surprise the town; nay, the consequence may be, that hearing of the exact discipline observed by the garrison, they will relinquish their design; for surprises seldom succeed, except through neglect of military duty, and too great security in the governor.

With regard to precautions against scalades, they consist in having small parties continually about the avenues of the place, in order to be better informed of the enemy's motions, and to keep a patrol all night, to see that nobody shall enter the ditch unperceived. A cuvert (F) may be likewise dug within the ditch, and palisades planted within some distance of the wall, to hinder the enemy from fixing their ladders to it; the flanks of the bastions should be furnished with cannon, charged with cartridge-shot, with balls of a quarter of a pound weight, or with pieces of old iron, to fire upon those who should attempt to scale the place opposite the curtains; in the corps de gardes, within reach of the rampart, a provision should be made of halberts, with all other offensive weapons fit for repelling the enemy when they appear on the top of the ladder, and for driving them into the ditch; the ramparts should be stocked with a great quantity of cylindrical timber, to roll down upon the ladders, and those that are upon them; and if the garrison are not so numerous as to be able to cover the whole ramparts, they should fix chevaux-de frize, or something else, to the upper part of the parapet, which will hinder the enemy from getting over, in order to jump upon the rampart. There ought also to be a stock of shells and grenades all loaden upon the walls, in order to roll them down into the ditch upon the enemy. There should likewise be fire-works ready to throw upon them, as fascines done over with pitch and tar, powder-barrels, fire-pots, &c.; a great number of fire-balls should be also slung into the ditch in order to give light, and that the cannon of the place may do good execution upon those who are got into it; the ditch should likewise be filled with crows feet, or little holes dug and covered with hurdles and earth, so that the enemy shall not perceive them, but tumble into them: in the middle of these little ditches there should be a palisade, or some long iron-spikes, ranged in such a manner as to run those through that shall fall upon them. Neither are the gates to be neglected; the enemy will not fail to try to fix a petard to them, while the troops are endeavouring to make themselves masters of the rampart. Soldiers must be placed in a convenient situation for firing on the person that fixes the petard: in all events the gates must be strengthened within, and large trees must be got ready to debar the enemy from entering the town, should they be able to break open the gate.

At the first alarm of an attack, all the troops ought to run to the place assigned them, in order to be led from thence to the ramparts. With regard to the cavalry, they ought also to mount on horseback, and to divide themselves into several small bodies, which are to be at the foot of the rampart, ready at all events to charge the enemy, should they find means to penetrate by some way or other into the town.

If the enemy make several attacks at the same time, it will not be proper to quit those parts where they do not show themselves; this perhaps is a feint only to draw the troops from the side which they really intend to attack; therefore the garrison should be equally on their guard on all sides, and leave no posts naked, unless the enemy have forced their way into the town: then indeed the bu-

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(F) A cuvert is a small ditch dug in the middle of the large one.

Of Sieges.

finess is to charge them vigorously, in order to oblige them to retire.

Upon the whole, it is easy to withstand a scalade when there is no surprise; and therefore it rarely happens that a governor, who takes the necessary precautions against any such accidents, will lose a town by this kind of attack.

A scalade may be attempted in the day as well as by night; the latter indeed is more favourable to the assailants, yet they will not succeed a whit the better, if they find that the garrison are prepared to receive them, agreeable to what we have already mentioned.

There remains only to mention a word or two in regard to accelerated sieges; which is, that a governor will not be exposed to this sort of siege, if he takes the proper precautions to be informed of the steps and approaches of the besiegers.

If the enemy pretend to carry on a siege in form, and at the same time accelerate their approaches on one side of the place, the garrison must fall vigorously upon them, and spare no pains to drive them out of what works they have seized upon. One may suspect their design, if it appears that they do not make their attack on the side of the town where naturally they ought to make it, that they want to become masters of the place with greater ease; and then the besieged should double their guard on that side. In general, there should be a constant attention to all the fronts of the place, and they should be all equally guarded, till it appears clearly by the enemy's works on which side they form their attack, and which way they direct their works; neither are the other sides to be even then neglected, lest the enemy should lay hold of this opportunity to attack them. It is always to be supposed that they are informed of every thing that passes within the town, either by their spies, or by deserters; for which reason the post that seems least accessible ought not to be neglected.

§ 11. Of Capitulations.

THE capitulation being the last transaction, both in the attack and defence of a town, this seems to be the most natural place for speaking of it, as it seems to be the most proper subject for terminating this article.

When the governor, who defends a town, finds himself reduced to the last extremity, or is ordered by his court to surrender, with a view of obtaining better conditions of the enemy, both for the town and garrison, he orders the chamade to be beat. For this purpose one or more drummers are directed to beat their drums on the rampart, on the side next to the attack, to give notice to the besiegers that the governor has something to propose to them; one or more white colours are likewise hung out for the same purpose, and one of them remains either on the rampart or on the breach during the time of negociation. The same is practised in demanding a suspension of arms, after a very violent attack, to bury the dead, carry off the wounded, &c.

As soon as the chamade is beat, the firing ceases on both sides, and the governor sends some officers of distinction to the general who commands the siege, with the conditions on which it is proposed to surrender. As a security, or as hostages for those officers, the besiegers send at the same time the same number into the town: if the governor's proposals are not agreeable to the commander of the besieging army, he rejects them, and mentions what terms he is willing to grant. Generally speaking, he threatens the governor to allow him no conditions at all, if he does not determine to surrender quickly; for instance, when the passage over the ditch of the place is finished, or batteries are erected opposite the flanks, &c. If the besieged find the conditions too

hard, the hostages are restored, and the drums are beat again upon the rampart, to make every body withdraw before hostilities are renewed, which is done very soon after. It is to be observed, that during the negotiation they ought to be quiet on both sides, and by no means should go on with the operations of the siege. The governor ought during this time to be upon his guard, for fear of being surprised by stratagem; which might expose him to the discretion of the besieger.

Suppose that the terms of capitulation are agreed upon, two or three of the principal officers of the garrison are sent as hostages to the enemy; and the general of the besieging army sends back the same number, and of equal degree, as a security for fulfilling the capitulation.

The conditions insisted upon by the besieged must vary according to the different circumstances and situations in which they find themselves. But when the capitulation is entirely settled, an officer of artillery from the besiegers enters the town, to take an inventory of all the artillery and ammunition remaining in the place, in conjunction with an officer of artillery from the garrison. A commissary of stores enters likewise to take an account of the provisions.

When a governor finds that he must surrender, and that there are considerable magazines of ammunition and provisions, he should destroy most of them before he offers to surrender, to the end that there may remain no more in the place than what is necessary for a capitulation, and that the enemy may reap no advantage from thence. If he should not, before he enters into a capitulation, burn or destroy those magazines, the enemy might insist on their being preserved; but they can think nothing of it when those precautions are taken beforehand.

As soon as the besieged have delivered up a gate of the town to the enemy, the first regiment of the army enters, and mounts guard.

When the day is come that the garrison are to leave the place, the besieging army is drawn up in two files of battalions and squadrons, and the garrison are to pass between them. The hour for their marching out being arrived, the general and the principal officers put themselves at the head of the troops, to see the garrison depart before them.

The governor puts himself at the head, followed by the principal officers; and he makes the garrison march in the best order possible. The oldest regiments move commonly in the van and the rear, and the others in the centre with their baggage. When there is any cavalry, it is divided in the same manner into three corps, for the van, the centre, and the rear. Small detachments of horse and foot are made to march along with the baggage, and to take care of its not being rifled.

The artillery granted by the capitulation marches after the first battalion. When the garrison arrive at the place agreed upon, they deliver up the hostages of the besiegers to the escort; and when the latter have rejoined the army, they send back the hostages which the besieged left for the security of the escort, with the waggons, and other things granted by the besieging army for escorting the garrison.

When the garrison are made prisoners of war, they are likewise escorted to the town agreed upon by the terms of the capitulation.

Every thing settled in the capitulation ought to be sacred and inviolable, and should be understood in its genuine and most natural sense: yet as this is not always practised, the governor should take the utmost precaution to have no word inserted that shall be in the least equivocal, or liable to different interpretations. There are a great many examples which prove the necessity of this precaution.

When

Of Sieges.

When the garrison of a town capitulate in order to retire to the citadel, there are some particular conditions to be observed; such as follow.

That the citadel shall not be attacked on the side next the town; that the sick and wounded, who cannot be removed, shall stay in their present lodgings; and when they are recovered, they shall be provided with carriages and transports to retire in safety to the place agreed on in the capitulation. None should be suffered to enter the citadel, but those who may be of use in defending it; the rest, who are called *useless mouths*, by no means ought to be admitted. Mention should be made in the capitulation, that those people shall be conducted to some neighbouring place in the dominions of their sovereign, which should be named. A certain time ought also to be allowed for the whole garrison to enter the citadel; and it should be expressly mentioned, that during this time the besiegers shall

construct no works that are necessary for the reduction of the citadel.

A maritime town requires also some particular attention, in regard to the ships that may be in the harbour. It should be stipulated, that they shall quit the harbour the same day as the garrison march out of the town, or when the weather permits to sail to the port agreed upon. They should preserve their artillery, rigging, ammunition and provisions, &c. If they should be obliged by stress of weather to put into any harbour of the besiegers by the way, it ought to be mentioned in the capitulation, that they shall be received there, and supplied with necessaries for continuing their voyage; they ought also to be provided with passports, and, in a word, to have every kind of security, that they shall not be insulted by the enemy's ships, but suffered without the least obstacle to steer to the port agreed upon.

W A R

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Man of War Bird. See PELICANUS.

WAR-Cry was formerly customary in the armies of most nations, when just upon the point of engaging. Sometimes they were only tumultuous shouts, or horrid yells, uttered with an intent to strike terror into their adversaries; such as is now used by the Indians in America, called the *war-whoop*.

WARBLES, in farriery See there § xxxii.

WARBURTON (William), who has been justly styled *vir magnus, acer, memorabilis*, was descended from an ancient and considerable family in Cheshire. His grandfather distinguished himself in the civil wars of the last century; and being of the royal party, probably injured his fortune by his attachment to his king and the constitution of his country. He married a lady of the county of Nottingham, by whom he had three sons; the second of whom, George, being bred to the law, practised as an attorney at Newark in that county.

William, the subject of this memoir, and the second son of Mr George Warburton, was born at Newark, December 24. 1698. He was first put to school there under a Mr Twells, but had the chief part of his education at Okeham in Rutlandshire, where he continued till the beginning of the year 1714, when, his cousin being made head master of the school at Newark, he returned to his native place, and was for a very short time under the care of that learned and respectable relation. In the month of April of the same year, he was put out clerk to Mr Kirke, an eminent attorney of Great Markham in Nottinghamshire; and continued with that gentleman till the spring of the year 1719. He then returned to his family at Newark; but whether he practised there or elsewhere as an attorney, is not known to his accomplished biographer, the bishop of Worcester.

He had always expressed a strong inclination to take orders; and the love of letters, which tended to retard, rather than forward, his progress in the profession chosen for him by his friends, growing every day stronger in him, it was deemed expedient to give way to that inclination. In the studies necessary to fit him for the church, he was directed by his cousin the schoolmaster of Newark; to whom, long afterwards, when he stood himself in the very front of literature, he gratefully acknowledged his obligations. At length, on the 22d of December 1723, he was ordained deacon by archbishop Davis of York, and priest on the first of March 1727, by bishop Gibson of London.

Though he never liked the profession of an attorney, he

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had certainly acquired a very considerable knowledge of the laws of England; for in a dispute which arose in 1726, about the judicial power of the court of chancery, he combated with success the opinions of no less a man than the lord chancellor Hardwicke, then attorney-general.

In 1728 he was presented by Sir Robert Sutton to the rectory of Brand-Broughton, in the diocese of Lincoln, where he spent the greater part of his life, and composed all the great works which will carry his fame down to posterity. In the same year he was put upon the king's list of Masters of Arts, erected on his majesty's visit to the university of Cambridge. He had already published some juvenile performances, which displayed genius and reading, and attracted considerable notice; but it was not till the year 1736 that he may be said to have emerged from the obscurity of a private life into the notice of the world.—The first publication which rendered him afterwards famous now appeared, under the title of “The Alliance between Church and State; or, the Necessity and Equity of an Established Religion and a Test Law; demonstrated from the Essence and End of Civil Society, upon the fundamental Principles of the Law of Nature and Nations.” In this treatise, says Bishop Horsley †, the author “hath shown the general good policy of an establishment, and the necessity of a Test for its security, upon principles which republicans themselves cannot easily deny. His work is one of the finest specimens that are to be found perhaps in any language, of scientific reasoning applied to a political subject.”

At the close of the Alliance was announced the scheme of the Divine Legation of Moses, in which he had then made a considerable progress. The first volume of this work was published in January 1737-8, under the title of “The Divine Legation of Moses demonstrated on the Principles of a religious Deist, from the Omission of the Doctrine of a future State of Rewards and Punishments in the Jewish Dispensation, in six books, by William Warburton, M. A. author of the Alliance between Church and State;” and met with a reception which neither the subject, nor the manner in which it was treated, seemed to authorize. It was, as the author afterwards observed, fallen upon in so outrageous and brutal a manner as had been scarce pardonable, had it been “The Divine Legation of Mahomet.”—It produced several answers, and so much abuse from the authors of “The Weekly Miscellany,” that in less than two months he was constrained to defend himself, in “A Vindication of the Author of the Divine Legation

Review of
the Case of
the Prote-
stant Dis-
senters,
1787.
Pref.

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gation of Moses, from the Aspersions of the Country Clergyman's Letter in the Weekly Miscellany of February 24. 1737-8, 8vo."

Mr Warburton's extraordinary merit had now attracted the notice of the heir apparent to the crown, in whose immediate service we find him in June 1738, when he published "Faith working by Charity to Christian Edification, a Sermon, preached at the last episcopal Visitation for Confirmation in the Diocese of Lincoln; with a Preface, showing the Reasons of its Publication; and a Postscript, occasioned by some Letters lately published in the Weekly Miscellany, by William Warburton, M. A. Chaplain to his Royal Highness the Prince of Wales."

In March 1737, the world was in danger of being deprived of this extraordinary genius by an intermitting fever, which with some difficulty was relieved by a plentiful use of the bark.

The "Essay on Man" had been now published some years; and it is universally supposed, that the author had, in the composition of it, adopted the philosophy of the Lord Bolingbroke, whom, on this occasion, he had followed as his guide, without understanding the tendency of his principles. In 1738, M. de Croufaz wrote some remarks on it, accusing the author of Spinozism and Naturalism; which falling into Mr Warburton's hands, he published a defence of the first epistle, and soon after of the remaining three, in seven letters; of which six were printed in 1739, and the seventh in June 1740, under the title of "A Vindication of Mr Pope's Essay on Man, by the author of the Divine Legation." The opinion which Mr Pope conceived of these defences, as well as of their author, will be best seen in his letters. In consequence, a firm friendship was established between them, which continued with undiminished fervour until the death of Mr Pope; who, during the remainder of his life, paid a deference and respect to his friend's judgment and abilities, which will be considered by many as almost bordering on servility.

Towards the end of the year 1739, Mr Warburton published a new and improved edition of the first volume of the Divine Legation; and in May 1741, appeared the second part, which completed the argument, though not the entire plan of that work. "A work, says Bishop Hurd †, in all views of the most transcendent merit, whether we consider the invention or the execution. A plain simple argument, yet perfectly new, proving the divinity of the Mosaic law, and laying a sure foundation for the support of Christianity, is there drawn out to a great length by a chain of reasoning so elegantly connected, that the reader is carried along it with ease and pleasure; while the matter presented to him is so striking for its own importance, so embellished by a lively fancy, and illustrated from all quarters by exquisite learning and the most ingenious disquisition, that in the whole compass of modern or ancient theology, there is nothing equal or similar to this extraordinary performance."

This is the panegyric of a man reflecting with tenderness on the memory of his friend and benefactor; but it approaches much nearer to the truth than the censures of those cabalistic critics, who, fastening upon some weak part of the Divine Legation, or perhaps never having looked into it, have ridiculously contended that the author was far from being eminent as a scholar (A), and that his work is inimical to the cause of Christianity! Putting partiality aside,

there is in the Divine Legation of Moses abundant evidence of the malignant folly of this charge, as no man can read and understand that work without being convinced that its author was a Christian, not only sincere but zealous; that he was, what Johnson calls him *, "a man of vigorous faculties, of a mind fervid and vehement, supplied by unlimited and incessant inquiry, with a wonderful extent and variety of knowledge, which had neither depressed his imagination nor clouded his perspicuity; and that to every work, and this work in particular, he brought a memory full fraught, with a fancy fertile of original combinations, exerting at once the powers of the scholar, the reasoner, and the wit." But we think it must be acknowledged, that his learning was too multifarious to be always exact, and his inquiries too eagerly pushed to be always cautious. We have no hesitation, however, to say, that to the divine this great work, with all its imperfections, is, in our opinion, one of the most valuable that is to be found in any language.

In the summer 1741, Mr Pope and Mr Warburton, in a country ramble, took Oxford in their way. The university was naturally pleased at the arrival of two such strangers, and seemed desirous of inrolling their names among their graduates. The degree of D. D. was intended for the divine, and that of L. L. D. for the poet: but intrigue and envy defeated this scheme; and the university lost the honour of decorating at the same time the two greatest geniuses of the age, by the fault of one or two of its members. Pope retired with some indignation to Twickenham, where he consoled himself and his friend with this sarcastic reflection—"We shall take our degree together in fame, whatever we do at the university."

The friendship of this eminent poet was of service to Mr Warburton in more respects than that of increasing his fame. He introduced and warmly recommended him to most of his friends, and among others to Mr Murray, afterwards earl of Mansfield, and Ralph Allen, Esq; of Prior-park. In consequence of this introduction, we find Mr Warburton at Bath 1742; where he printed a sermon which had been preached at the Abbey-church on the 24th of October, for the benefit of Mr Allen's favourite charity, the General Hospital or Infirmary. In this year also he printed a Dissertation on the origin of books of chivalry, at the end of Jarvis's Preface to a translation of Don Quixote, which Mr Pope tells him, he had not got over two paragraphs of, before he cried out, *Aut Erasmus, aut Diabolus*.

In 1742, Mr Warburton published "A Critical and Philosophical Commentary on Mr Pope's Essay on Man. In which is contained a Vindication of the said Essay from the Misrepresentation of M. de Resnal, the French Translator, and of M. de Croufaz, Professor of Philosophy and Mathematics in the Academy of Lausanne, the Commentator." It was at this period, when Mr Warburton had the entire confidence of Mr Pope, that he advised him to complete the Dunciad, by changing the hero, and adding to it a fourth book. This was accordingly executed in 1742, and published early in 1743, with notes by our author; who, in consequence of it, received his share of the abuse which Mr Cibber liberally bestowed on both Mr Pope and his annotator. In the latter end of the same year he published complete editions of "The Essay on Man," and "The Essay on Criticism;" and from the specimen which he there exhibited of his abilities, it may be presumed Mr Pope

† Life of
Warburton
prefixed to
his Works.

(A) We have heard this affirmed by narrow-minded clergymen, who were destitute themselves of every spark of science, and had no other claim to literature than what arose from a slight acquaintance with Hebrew critics of a very peculiar cast; to whom, it must be owned, that no great respect was indeed ever paid by the author of the Divine Legation of Moses.

Warbur-
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Pope determined to commit the publication of those works which he should leave to Mr Warburton's care. At Mr Pope's desire, he, about this time, revised and corrected the "Essay on Homer," as it now stands in the last edition of that translation.

The publication of "The Dunciad" was the last service which our author rendered Mr Pope in his lifetime. After a lingering and tedious illness, the event of which had been long foreseen, this great poet died on the 30th of May 1744; and by his will, dated the 12th of the preceding December, bequeathed to Mr Warburton one half of his library, and the property of all such of his works already printed as he had not otherwise disposed of or alienated, and all the profits which should arise from any edition to be printed after his death: but at the same time directed that they should be published without any future alterations.

"In 1744, Mr Warburton turned his attention to the several attacks which had been made on the "Divine Legation," and defended himself in a manner which, if it did not prove him to be possessed of much humility or diffidence, at least demonstrated, that he knew how to wield the weapons of controversy with the hand of a master. His first defence now appeared, under the title of "Remarks on several occasional Reflections, in Answer to the Reverend Dr Middleton, Dr Pococke, the Master of the Charter-House, Dr Richard Grey, and others; serving to explain and justify divers Passages in the Divine Legation, objected to by those learned Writers. To which is added, A General Review of the Argument of the Divine Legation, as far as it is yet advanced; wherein is considered the Relation the several Parts bear to each other and the whole. Together with an Appendix, in Answer to a late Pamphlet intitled, An Examination of Mr W——'s second Proposition." This was followed next year by "Remarks on several occasional Reflections, in Answer to the Reverend Doctors Stebbing and Sykes; serving to explain and justify the Two Dissertations in the Divine Legation, concerning the Command to Abraham to offer up his Son, and the Nature of the Jewish Theocracy, objected to by these learned Writers. Part II. and last." Both these answers are couched in those high terms of confident superiority, which marked almost every performance that fell from his pen during the remainder of his life.

On the 5th of September 1745, the friendship between him and Mr Allen was more closely cemented by his marriage with Miss Tucker, who survived him, and is now, if alive, Mrs Stafford Smith of Prior-park. At that important crisis our author preached and published three seasonable sermons: 1. "A faithful Portrait of Popery, by which it is seen to be the Reverse of Christianity, as it is the Destruction of Morality, Piety, and Civil Liberty. Preached at St James's, Westminster, October 1745." 2. "A Sermon occasioned by the present unnatural Rebellion, &c. Preached in Mr Allen's Chapel at Prior-park, near Bath, November 1745." 3. "The Nature of National Offences truly stated.—Preached on the General Fast-day, December 18. 1745-6." On account of the last of these sermons, he was again involved in a controversy with his former antagonist Dr Stebbing, which occasioned "An Apologetical Dedication to the Reverend Dr Henry Stebbing, in Answer to his Censure and Misrepresentations of the Sermon preached on the General Fast, &c."

Notwithstanding his great connections, his acknowledged abilities, and his established reputation, a reputation founded on the durable basis of learning, and upheld by the decent and attentive performance of every duty incident to his station; yet we do not find that he received any addi-

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tion to the preferment given him in 1728 by Sir Robert Sutton (except the chaplainship to the prince of Wales), until April 1746, when he was unanimously called by the Society of Lincoln's Inn to be their preacher. In November he published "A Sermon preached on the Thanksgiving appointed to be observed the 9th of October, for the Suppression of the late unnatural Rebellion." In 1747 appeared his edition of Shakespeare, and his Preface to Clarissa; and in the same year he published, 1. "A Letter from an Author to a Member of Parliament concerning Literary Property." 2. "Preface to Mrs Cockburn's Remarks upon the Principles and Reasonings of Dr Rutherford's Essay on the Nature and Obligations of Virtue," &c. 3. "Preface to a Critical Inquiry into the Opinions and Practice of the ancient Philosophers, concerning the Nature of a Future State, and their Method of teaching by double Doctrine," (by Mr Towne) 1747, second edition. In 1748, a third edition of "The Alliance between Church and State, corrected and enlarged."

"In 1749, a very extraordinary attack was made on the moral character of Mr Pope, from a quarter where it could be the least expected. An insignificant pamphlet, under the name of *A Patriot King*, was that year published by Lord Bolingbroke, or by his direction, with a preface to it, reflecting highly on Mr Pope's honour. The provocation was simply this: The manuscript of that trivial declamation had been intrusted to the care of Mr Pope, with the charge (as it was pretended) that only a certain number of copies should be printed. Mr Pope, in his excessive admiration of his guide, philosopher, and friend, took that opportunity, for fear so invaluable a treasure of patriot eloquence should be lost to the public, to exceed his commission, and to run off more copies, which were found, after his death, in the printer's warehouse. This charge, however frivolous, was aggravated beyond measure; and, notwithstanding the proofs which Lord Bolingbroke had received of Pope's devotion to him, envenomed with the utmost malignity. Mr Warburton thought it became him to vindicate his deceased friend; and he did it so effectually, as not only to silence his accuser, but to cover him with confusion †."

About this time the publication of Dr Middleton's Inquiry concerning the miraculous Powers of the Christian Church, gave rise to a controversy, which was managed with great warmth and asperity on both sides, and not much to the credit of either party. On this occasion Mr Warburton published an excellent performance, written with a degree of candour and temper, which, it is to be lamented, he did not always exercise. The title of it was "*Julian*; or a Discourse concerning the Earthquake and fiery Eruption which defeated that Emperor's attempt to rebuild the Temple at Jerusalem, 1750." A second edition of this discourse, "with Additions," appeared in 1751, in which year he gave the public his edition of Mr Pope's Works, with Notes, in nine volumes 8vo; and in the same year printed "An Answer to a Letter to Dr Middleton, inserted in a Pamphlet intitled, The Argument of the Divine Legation fairly stated," &c.; and "An Account of the Prophecies of Arise Evans, the Welsh Prophet in the last Century," annexed to the first volume of Dr Jortin's Remarks on Ecclesiastical History, which afterwards subjected him to much trouble.

In 1752, Mr Warburton published the first volume of a course of sermons, preached at Lincoln's Inn, intitled, "The Principles of Natural and Revealed Religion, occasionally opened and explained;" and this was two years afterwards followed by a second. After the public had been some time promised, it may, from the alarm which was taken, be almost said threatened with, the appearance of Lord Bolingbroke's Works, they were about this time printed.

† Hurd's
Life of
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printed. The known abilities and infidelity of this nobleman had created apprehensions in the minds of many people, of the pernicious effects of his doctrines; and nothing but the appearance of his whole force could have convinced his friends, how little there was to be dreaded from arguments against religion so weakly supported. Many answers were soon published, but none with more acuteness, solidity, and sprightliness, than "A View of Lord Bolingbroke's Philosophy, in two Letters to a Friend, 1754;" the third and fourth letters were published in 1755, with another edition of the two former; and in the same year a smaller edition of the whole; which, though it came into the world without a name, was universally ascribed to Mr Warburton, and afterwards publicly owned by him. To some copies of this is prefixed an excellent complimentary epistle from the President Montaigne, dated May 26. 1754.

At this advanced period of his life, that preferment which his abilities might have claimed, and which had hitherto been withheld, seemed to be approaching towards him. In September 1754, he was appointed one of his Majesty's chaplains in ordinary, and in the next year was presented to a prebend in the cathedral of Durham, on the death of Dr Mangey. About this time the degree of Doctor of Divinity was conferred on him by Dr Herring, then archbishop of Canterbury. A new impression of The Divine Legation being now called for, he printed a fourth edition of the first part of it, corrected and enlarged, divided into two volumes, with a dedication to the earl of Hardwicke. The same year appeared "A Sermon preached before his Grace Charles Duke of Marlborough, President, and the Governors of the Hospital for the Small-pox and for Inoculation, at the Parish-church of St Andrew, Holborn, April the 24th, 1755." And in 1756, "Natural and Civil Events the Instruments of God's Moral Government; a Sermon, preached on the last public Fast-day, at Lincoln's Inn Chapel."

In 1757, Dr Warburton meeting with Mr Hume's tract, entitled, The Natural History of Religion, filled the margin of the book, as well as some interleaved slips of paper, with many severe and shrewd remarks on the infidelity and naturalism of the author. These he put into the hands of his friend Dr Hurd, who, making a few alterations of the style, added a short introduction and conclusion, and published them in a pamphlet, entitled, "Remarks on Mr David Hume's Natural History of Religion, by a Gentleman of Cambridge, in a Letter to the Reverend Dr Warburton." This lively attack upon Mr Hume gave him so much offence, that he thought proper to vent his spleen on the supposed author, in the posthumous discourse which he called his *Life*; and thus to do greater honour to Dr Hurd than to any other of his numerous antagonists.

Towards the end of the year 1757, Dr Warburton was promoted to the deanery of Bristol; and in the beginning of the year 1760, he was, through Mr Allen's interest with Mr Pitt, afterwards earl of Chatham, advanced to the bishopric of Gloucester. That great minister is known to have declared, "that nothing of a private nature, since he had been in office, had given him so much pleasure as bringing our author on the bench." There was, however, another minister, who dreaded his promotion, and thought that he saw a second Atterbury in the new bishop of Gloucester; but Warburton, says bishop Hurd, had neither talents nor inclination for parliamentary intrigue or parliamentary eloquence: he had other instruments of fame in his hands, and was infinitely above the vanity of being caught

† Dryden.

"With the fine notion of a busy man †."

He was consecrated on the 20th of January 1760, and

on the 30th of the same month preached before the house of lords. In the next year he printed "A Rational Account of the Nature and End of the Sacrament of the Lord's Supper." In 1762, he published "The Doctrine of Grace; or the Office and Operations of the Holy Spirit vindicated from the Insults of Infidelity and the Abuses of Fanaticism," 2 vols 12mo; and in the succeeding year drew upon himself much illiberal abuse from some writers of the popular party, on occasion of his complaint in the house of lords, on the 15th of November 1763, against Mr Wilkes, for putting his name to certain notes on the infamous "Essay on Woman."

In 1765 he published a new edition of the second part of the Divine Legation, in three volumes; and as it had now received his last hand, he presented it to his great friend Lord Mansfield, in a dedication which deserves to be read by every person who esteems the well-being of society as a concern of any importance. It was the appendix to this edition which produced the well-known controversy between him and Dr Lowth, which we have noticed elsewhere (see LOWTH), as doing no great honour, by the mode in which it was conducted, to either party. In the next year he gave a new and much improved edition of the Alliance between the Church and State. This was followed, in 1767, by a third volume of sermons, to which is added, his first Triennial Charge to the Clergy of the Diocese of Gloucester; which may be safely pronounced one of the most valuable discourses of the kind that is to be found in our own or any other language. With this publication he closed his literary course; except that he made an effort towards publishing, and actually printed, the ninth and last book of the Divine Legation. This book, with one or two occasional sermons, and some valuable directions for the study of *theology*, have been given to the world in the splendid edition of his works in seven volumes 4to, by his friend and biographer the present bishop of Worcester. That prelate confesses, that the ninth book of the Divine Legation displays little of that vigour of mind and fertility of invention which appear so conspicuous in the former volumes; but he adds, perhaps truly, that under all the disadvantages with which it appears, it is the noblest effort which has hitherto been made to give a *rationale* of Christianity.

While the bishop of Gloucester was thus exerting his last strength in the cause of religion, he projected a method by which he hoped to render it effectual service after his death. He transferred L. 500 to Lord Mansfield, Sir Eardley Wilmot, and Mr Charles Yorke, upon trust, to found a lecture, in the form of a course of sermons, to prove the truth of revealed religion in general, and of the Christian in particular, from the completion of the prophecies in the Old and New Testament, which relate to the Christian church, especially to the apostacy of Papal Rome. To this foundation we owe the admirable Introductory Lectures of Hurd, and the well-adapted Continuation of Halifax and Bagot.

It is a melancholy reflection, that a life spent in the constant pursuit of knowledge, frequently terminates in the loss of those powers, the cultivation and improvement of which are attended to with too strict and unabated a degree of ardour. This was in some degree the misfortune of Dr Warburton. Like Swift, and the great duke of Marlborough, he gradually sunk into a situation in which it was a fatigue to him to enter into general conversation. There were, however, a few old and valuable friends, in whose company, even to the last, his mental faculties were exerted in their wonted force; and at such times he would appear cheerful for several hours, and on the departure of his friends retreat as it were within himself. This melancholy habit

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habit was aggravated by the loss of his only son, a very promising young gentleman, who died of a consumption but a short time before the Bishop, who himself resigned to fate in the 81st year of his age. A neat marble monument has been erected to him in the cathedral of Gloucester, with this inscription—

To the Memory of
WILLIAM WARBURTON, D. D.
For more than 19 Years Bishop of this See;
A Prelate
Of the most sublime Genius, and exquisite Learning.
Both which Talents
He employed, through a long Life,
In the Support
Of what he firmly believed,
THE CHRISTIAN RELIGION;
And
Of what he esteemed the best Establishment of it,
THE CHURCH OF ENGLAND.
He was born at Newark upon Trent,
Dec. 24. 1698.
Was consecrated BISHOP of Gloucester,
Jan. 20. 1760.
Died at his Palace, in this City,
June 7. 1779.
And was buried near this Place.

WARD (Dr Seth), an English prelate, chiefly famous for his knowledge in mathematics and astronomy, was born at Buntingford in Hertfordshire, about the year 1617. He was admitted of Sidney college, Cambridge, where he applied with great vigour to his studies, particularly to the mathematics, and was chosen fellow of his college. He was involved not a little in the consequences of the civil war, but soon after the Restoration obtained the bishopric of Exeter; in 1667, he was translated to Salisbury; and in 1671 was made chancellor of the order of the garter; he was the first Protestant bishop that enjoyed that honour, and he procured it to be annexed to the see of Salisbury. Bishop Ward was one of those unhappy persons who have the misfortune to survive their senses, which happened in consequence of a fever ill cured; he lived to the Revolution, without knowing any thing of the matter, and died in 1690. He was the author of several Latin works in mathematics and astronomy, which were thought excellent in their day; but their use has been superseded by later discoveries and the Newtonian philosophy.

WARD (Dr John), was the son of a dissenting minister, and born at London in 1679. He for some years kept a school in Tenter-alley, Moorfields; but rendered himself so eminent in the study of antiquity, that in 1720 he was chosen professor of rhetoric in Gresham college: in 1723, during the presidency of Sir Isaac Newton, he was elected a fellow of the Royal Society; and in 1752 one of the vice-presidents, in which office he was continued to his death. He was elected one of the trustees of the British Museum in 1753, and died at Gresham college in 1758. The work for which he is best known, is his *Lives of the Professors of Gresham College*; which is a considerable addition to the history of learning in our country. His *Lectures on Oratory* were published after his death, in two volumes 8vo.

WARD, is variously used in our old books: a ward in London is a district or division of the city, committed to the special charge of one of the aldermen; and in London there are 26 wards, according to the number of the mayor and aldermen, of which every one has his ward for his proper guard and jurisdiction. A forest is divided into

wards; and a prison is called a *ward*. Lastly, the heir of the king's tenant, that held *in capite*, was termed a *ward* during his nonage; but this wardship is taken away by the statute 12 Car. II. c. 24.

WARD-Holding, in Scots law. See LAW, N^o clxv. 1. and clxvi. 3.

WARD-HOOK, or Wadd-hook, in gunnery, a rod or staff, with an iron end turned serpentwise, or like a screw, to draw the wadding out of a gun when it is to be unloaded.

WARDEN, or GUARDIAN, one who has the charge or keeping of any person, or thing, by office. Such is the warden of the Fleet, the keeper of the Fleet prison; who has the charge of the prisoners there, especially such as are committed from the court of chancery for contempt.

WARDHUYS, a port of Norwegian Lapland, 120 miles south-east of the North Cape. E. Long. 31. 12. N. Lat. 70. 23.

WARDMOTE, in London, is a court so called, which is kept in every ward of the city; answering to the *curia comitia* of Rome.

WARDROBE, a closet or little room adjoining to a bed-chamber, serving to dispose and keep a person's apparel in; or for a servant to lodge in, to be at hand to wait, &c.

Wardrobe, in a prince's court, is an apartment wherein his robes, wearing apparel, and other necessities, are preserved under the care and direction of proper officers.

In Britain, the *Master or Keeper of the Great Wardrobe* was an officer of great antiquity and dignity. High privileges and immunities were conferred on him by king Henry VI. which were confirmed by his successors; and king James I. not only enlarged them, but ordained that this office should be a corporation or body politic for ever.

It was the duty of this office to provide robes for the coronations, marriages, and funerals of the royal family; to furnish the court with hangings, cloths of state, carpets, beds, and other necessities; to furnish houses for ambassadors at their first arrival; cloths of state, and other furniture, for the lord lieutenant of Ireland, and all his majesty's ambassadors abroad; to provide all robes for foreign knights of the garter, robes for the knights of the garter at home; robes and all other furniture for the officers of the garter; coats for kings, heralds, and pursuivants at arms; robes for the lords of the treasury, and chancellor of the exchequer, &c. livery for the lord chamberlain, grooms of his majesty's privy chamber, officers of his majesty's robes; for the two chief justices, for all the barons of the exchequer, and several officers of these courts; all liveries for his majesty's servants, as yeoman of the guard, and wardens of the Tower, trumpeters, kettle-drummers, drummers, and fifes; the messengers, and all belonging to the stables, as coachmen, footmen, littermen, postilions, and grooms, &c. all the king's coaches, chariots, harnesses, saddles, bits, bridles, &c. the king's water-men, game-keepers, &c. also furniture for the royal yachts, and all rich embroidered tilts, and other furniture for the barges.

Besides the master or keeper of the wardrobe, who had a salary of L. 2000, there was his deputy, who had L. 150, and comptroller and a patent clerk, each of whom has a salary of L. 300. Besides many other inferior officers and servants, who were all sworn servants to the king.

There was likewise a removing wardrobe, who had its own set of officers, and standing wardrobe-keepers at St. James's, Windsor Castle, Hampton Court, Kensington, and Somerset House; but the whole of the wardrobe establishment was abolished by act of Parliament in 1782, and the duty of it in future to be done by the lord chamberlain.

WARDSHIP, in chivalry, one of the incidents of tenure

Ward
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Wardship.

Beaumont's
Political In-
dex, vol. ii.

Wardship. nure by knight-service. See *FEODAL System*, *KNIGHT Service*, and *TENURE*.

Upon the death of a tenant, if the heir was under the age of 21, being a male, or 14, being a female, the lord was intitled to the wardship of the heir, and was called the *guardian in chivalry*. This wardship consisted in having the custody of the body and lands of such heir, without any account of the profits, till the age of 21 in males, and 16 in females. For the law supposed the heir-male unable to perform knight-service till 21; but as for the female, she was supposed capable at 14 to marry, and then her husband might perform the service. The lord therefore had no wardship, if at the death of the ancestor the heir-male was of the full age of 21, or the heir-female of 14: yet if she was then under 14, and the lord once had her in ward, he might keep her so till 16, by virtue of the statute of Westminster, 1. 3 Edw. I. c. 22. the two additional years being given by the legislature for no other reason but merely to benefit the lord.

This wardship, so far as it related to land, though it was not nor could be part of the law of feuds, so long as they were arbitrary, temporary, or for life only; yet when they became hereditary, and did consequently often descend upon infants, who by reason of their age could neither perform nor stipulate for the services of the feud, does not seem upon feudal principles to have been unreasonable. For the wardship of the land, or custody of the feud, was retained by the lord, that he might out of the profits thereof provide a fit person to supply the infant's services till he should be of age to perform them himself. And if we consider a feud in its original import, as a stipend, fee, or reward for actual service, it could not be thought hard that the lord should withhold the stipend so long as the service was suspended. Though undoubtedly to our English ancestors, where such stipendary donation was a mere supposition or figment, it carried abundance of hardship; and accordingly it was relieved by the charter of Henry I. which took this custody from the lord, and ordained that the custody, both of the land and the children, should belong to the widow or next of kin. But this noble immunity did not continue many years.

The wardship of the body was a consequence of the wardship of the land; for he who enjoyed the infant's estate was the properest person to educate and maintain him in his infancy: and also in a political view, the lord was most concerned to give his tenant a suitable education, in order to qualify him the better to perform those services which in his maturity he was bound to render.

When the male heir arrived to the age of 21, or the heir-female to that of 16, they might sue out their livery or *ousterlemain*; that is, the delivery of their lands out of their guardian's hands. For this they were obliged to pay a fine, namely, half-a-year's profits of the land; though this seems expressly contrary to *magna charta*. However, in consideration of their lands having been so long in ward, they were excused all reliefs, and the king's tenants also all primer feins. In order to ascertain the profits that arose to the crown by these fruits of tenure, and to grant the heir his livery, the itinerant justices, or justices in eyre, had it formerly in charge to make inquisition concerning them by a jury of the county, commonly called an *inquisitio post mortem*; which was instituted to inquire (at the death of any man of fortune) the value of his estate, the tenure by which it was holden, and who, and of what age, his heir was; thereby to ascertain the relief and value of the primer feisin, or the wardship and livery accruing to the king thereupon. A manner of proceeding that came in process of time to be greatly abused, and at length an intolerable grievance; it being one of the

principal accusations against Empson and Dudley, the wicked engines of Henry VII. that by colour of false inquisitions they compelled many persons to sue out livery from the crown, who by no means were tenants thereunto. And afterwards a court of wards and liveries was erected, for conducting the same inquiries in a more solemn and legal manner.

When the heir thus came of full age, provided he held a knight's fee, he was to receive the order of knighthood, and was compellable to take it upon him, or else pay a fine to the king. For in those heroical times no person was qualified for deeds of arms and chivalry who had not received this order, which was conferred with much preparation and solemnity. We may plainly discover the footsteps of a similar custom in what Tacitus relates of the Germans, who, in order to qualify their young men to bear arms, presented them in a full assembly with a shield and lance; which ceremony is supposed to have been the original of the feudal knighthood. This prerogative, of compelling the vassals to be knighted, or to pay a fine, was expressly recognised in parliament by the statute *de militibus*, 1 Edw. II.; was exerted as an expedient for raising money by many of our best princes, particularly by Edw. VI. and Q. Elizabeth; but this was the occasion of heavy murmurs when exerted by Charles I.: among whose many misfortunes it was, that neither himself nor his people seemed able to distinguish between the arbitrary stretch and the legal exertion of prerogative. However, among the other concessions made by that unhappy prince before the fatal recourse to arms, he agreed to divest himself of this undoubted flower of the crown; and it was accordingly abolished by statute 16 Car. I. c. 20.

WARE, a town of Hertfordshire, with a market on Tuesdays, and a fair on the last Tuesday in April, and Tuesday before St Matthew's day (Sep. 21.) for horses and other cattle. It is a large, well frequented, and well inhabited thoroughfare town, seated on the river Lea, 21 miles north of London. It carries on a great trade in malt and corn, which they are continually sending in large quantities to London. E. Long 0. 3. N. Lat. 51. 50.

WARN, in law, is to summon a person to appear in a court of justice.

WARNING of TENANTS, in Scots law. See *LAW*, N° clxvii. 16.

WARP, in the manufactures, a name for the threads, whether of silk, wool, linen, hemp, &c. that are extended lengthwise on the weaver's loom; and across which the workman, by means of his shuttle, passes the threads of the woof, to form a cloth, ribband, fustian, or the like.

WARP, a small rope employed occasionally to remove a ship from one place to another, in a port, road, or river. And hence,

To WARP, is to change the situation of a ship, by pulling her from one part of a harbour, &c. to some other, by means of warps, which are attached to buoys; to anchors sunk in the bottom; or to certain stations upon the shore, as posts, rings, trees, &c. The ship is accordingly drawn forwards to those stations, either by pulling on the warps by hand, or by the application of some purchase, as a tackle, windlass, or capstern, upon her deck.

When this operation is performed by the ship's lesser anchors, these machines, together with their warps, are carried out in the boats alternately towards the place where the ship is endeavouring to arrive: so that when she is drawn up close to one anchor, the other is carried out to a competent distance before her, and being sunk, serves to fix the other warp, by which she is farther advanced.

Warping is generally used when the sails are unbent, or when

Encyclopaedia britannica or a dictionary of arts, sciences and
miscellaneous literature

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